

Province of British Columbia

# PLUMBING CODE

1985

Ministry of Municipal Affairs



**Province of British Columbia**  
**Plumbing Code**  
**1985**

**Ministry of  
Municipal Affairs**

## **Canadian Cataloguing in Publication Data**

Main entry under title:

Province of British Columbia plumbing code. 1985

"Adopted from the Canadian plumbing code" -- p.

Includes index.

ISBN 0-7726-0594-7

I. Plumbing - Law and legislation - British Columbia. I. British Columbia. Ministry of Municipal Affairs. II. Canadian plumbing code, 1985.

KEB504.P76 1985

343.711'0786961

C87-092023-5

## TABLE OF CONTENTS

|                                                                   | Page       |
|-------------------------------------------------------------------|------------|
| <b>ACKNOWLEDGEMENTS .....</b>                                     | <b>vii</b> |
| <b>PREFACE.....</b>                                               | <b>ix</b>  |
| <b>SECTION 1 GENERAL REQUIREMENTS AND<br/>ADMINISTRATION.....</b> | <b>1</b>   |
| Subsection 1.1 Application .....                                  | 1          |
| Subsection 1.2 Scope .....                                        | 1          |
| Subsection 1.3 Definitions and Abbreviations.....                 | 1          |
| Subsection 1.4 Equivalents .....                                  | 6          |
| Subsection 1.5 Plumbing Facilities.....                           | 6          |
| Subsection 1.6 Service Connections.....                           | 6          |
| Subsection 1.7 Location of Fixtures.....                          | 6          |
| Subsection 1.8 Plumbing Drawings and Related<br>Documents.....    | 6          |
| Subsection 1.9 Inspection and Testing.....                        | 6          |
| Subsection 1.10 Referenced Documents .....                        | 7          |
| <b>SECTION 2 MATERIALS AND EQUIPMENT .....</b>                    | <b>11</b>  |
| Subsection 2.1 General .....                                      | 11         |
| Subsection 2.2 Fixtures .....                                     | 11         |
| Subsection 2.3 Traps and Interceptors .....                       | 12         |
| Subsection 2.4 Pipe Fittings .....                                | 13         |
| Subsection 2.5 Non-Metallic Pipe and Fittings.....                | 13         |
| Subsection 2.6 Ferrous Pipe and Fittings .....                    | 15         |
| Subsection 2.7 Non-Ferrous Pipe and Fittings.....                 | 17         |
| Subsection 2.8 Jointing Materials .....                           | 18         |
| Subsection 2.9 Miscellaneous Materials .....                      | 18         |
| <b>SECTION 3 PIPING.....</b>                                      | <b>20</b>  |
| Subsection 3.1 Application .....                                  | 20         |
| Subsection 3.2 Construction and Use of Joints.....                | 20         |
| Subsection 3.3 Joints and Connections .....                       | 22         |
| Subsection 3.4 Support of Piping.....                             | 23         |
| Subsection 3.5 Protection of Piping .....                         | 24         |
| Subsection 3.6 Testing of Drainage and<br>Venting Systems .....   | 25         |
| Subsection 3.7 Testing of Potable Water Systems .....             | 26         |
| <b>SECTION 4 DRAINAGE SYSTEMS.....</b>                            | <b>27</b>  |
| Subsection 4.1 Application .....                                  | 27         |
| Subsection 4.2 Connections to Drainage Systems .....              | 27         |
| Subsection 4.3 Location of Fixtures.....                          | 28         |
| Subsection 4.4 Treatment of Sewage and Wastes.....                | 29         |
| Subsection 4.5 Traps .....                                        | 29         |

|                                                                                                                                                           | <b>Page</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Subsection 4.6</b> <b>Arrangement of Drainage Piping.....</b>                                                                                          | <b>30</b>   |
| <b>Subsection 4.7</b> <b>Cleanouts .....</b>                                                                                                              | <b>31</b>   |
| <b>Subsection 4.8</b> <b>Minimum Slope and Length of<br/>                         Drainage Pipes .....</b>                                                | <b>33</b>   |
| <b>Subsection 4.9</b> <b>Size of Drainage Pipes.....</b>                                                                                                  | <b>33</b>   |
| <b>Subsection 4.10</b> <b>Hydraulic Loads.....</b>                                                                                                        | <b>35</b>   |
| <b>SECTION 5</b> <b>VENTING SYSTEMS.....</b>                                                                                                              | <b>39</b>   |
| <b>Subsection 5.1</b> <b>Vent Pipes for Traps .....</b>                                                                                                   | <b>39</b>   |
| <b>Subsection 5.2</b> <b>Wet Venting.....</b>                                                                                                             | <b>39</b>   |
| <b>Subsection 5.3</b> <b>Circuit Venting .....</b>                                                                                                        | <b>47</b>   |
| <b>Subsection 5.4</b> <b>Vent Pipes for Soil-or-Waste Stacks....</b>                                                                                      | <b>58</b>   |
| <b>Subsection 5.5</b> <b>Miscellaneous Vent Pipes .....</b>                                                                                               | <b>59</b>   |
| <b>Subsection 5.6</b> <b>Arrangement of Vent Pipes.....</b>                                                                                               | <b>59</b>   |
| <b>Subsection 5.7</b> <b>Minimum Size of Vent Pipes.....</b>                                                                                              | <b>61</b>   |
| <b>Subsection 5.8</b> <b>Sizing of Vent Pipes .....</b>                                                                                                   | <b>61</b>   |
| <b>SECTION 6</b> <b>POTABLE WATER SYSTEMS.....</b>                                                                                                        | <b>65</b>   |
| <b>Subsection 6.1</b> <b>Arrangement of Piping .....</b>                                                                                                  | <b>65</b>   |
| <b>Subsection 6.2</b> <b>Protection from Contamination .....</b>                                                                                          | <b>66</b>   |
| <b>Subsection 6.3</b> <b>Size and Capacity of Pipes .....</b>                                                                                             | <b>68</b>   |
| <b>SECTION 7</b> <b>NON-POTABLE WATER SYSTEMS.....</b>                                                                                                    | <b>71</b>   |
| <b>Subsection 7.1</b> <b>Connection .....</b>                                                                                                             | <b>71</b>   |
| <b>Subsection 7.2</b> <b>Identification.....</b>                                                                                                          | <b>71</b>   |
| <b>Subsection 7.3</b> <b>Location.....</b>                                                                                                                | <b>71</b>   |
| <b>APPENDIX A</b> <b>EXPLANATORY MATERIAL FOR THE<br/>                         BRITISH COLUMBIA PLUMBING<br/>                         CODE 1985 .....</b> | <b>73</b>   |
| <b>INDEX .....</b>                                                                                                                                        | <b>135</b>  |

## ACKNOWLEDGEMENTS

The Minister of Municipal Affairs wishes to thank the many individuals and organizations who have contributed to the preparation of the British Columbia Plumbing Code. The following individuals who voluntarily served on a committee which reviewed the many changes and additions proposed deserve special mention.

PETER HOLLO (Chairman)  
American Society of  
Plumbing Engineers  
- B.C. Chapter

T. BALSON  
Interior Plumbing  
Code Committee

JOHN CHACE  
Building Inspectors  
Association of B.C.

A. EVERALL  
Northern Plumbing  
Code Committee

JACK FORREST  
Canadian Institute of  
Plumbing and Heating  
- B.C. Region

AL KOEHLI  
Canadian Home Builders  
Association of B.C.

ANGUS MACAULAY  
City of Vancouver

JOHN MASSE  
B.C. Institute of Technology

JACK RILEY  
Mechanical Contractors  
Association of B.C.

R.W. RUSH (Chairman) <sup>1</sup>  
Building Inspectors  
Association of B.C.

D.S. McDONALD (Secretary) <sup>2</sup>

<sup>1</sup> Term completed during preparation of the 1985 Code.

<sup>2</sup> Municipal Affairs staff who provided assistance to the committee.



## PREFACE

The British Columbia Plumbing Code has been adapted from the 1985 Canadian Plumbing Code with changes to suit provincial needs.

Where changes appear from the 1980 Canadian Plumbing Code the paragraphs affected have been indicated by vertical lines in the margin.

An asterisk\* in the margin indicates a change or addition to the 1985 Canadian Plumbing Code at the time it was adopted in British Columbia as the base document for the British Columbia Plumbing Code 1985.

The requirements contained in this Code are supported by explanatory material and diagrams contained in Appendix A, and contained in "Section 5 Venting Systems".

The illustrations contained in "Section 5 Venting Systems" have been prepared by the Plumbing Department of the British Columbia Institute of Technology as a guide to assist the user, because of the complexity of the conditions encompassed within Section 5 of the Code.

It must be understood, however, that the illustrations contained in "Section 5 Venting Systems" represent the views of the contributors. These opinions cannot be construed as providing final interpretations of requirements contained in the Plumbing Code.

Except for Section 5 the body of the Code consists of regulatory material only.

The first line of each item in the Appendix contains in bold-face type a reference to the definitions or requirements to which the explanatory material is applicable. These references have been placed in alphabetical or numerical order to ensure that they are easily found when they are referred to in the text.

It is divided into seven Sections, each Section being self-sufficient with a minimum of cross references. A decimal number system has been used throughout the Code. The first number indicates the Section of the Code, the second, the Subsection in the Section, the third the Article and the fourth the Sentence in the Article. A Sentence (indicated by numbers in brackets) may be further divided into Clauses and Subclauses. These are illustrated as follows:

|                 |            |
|-----------------|------------|
| 4               | Section    |
| 4.6             | Subsection |
| 4.6.5.          | Article    |
| 4.6.5.(1)       | Sentence   |
| 4.6.5.(1)(c)    | Clause     |
| 4.6.5.(1)(c)(i) | Subclause  |

This edition has been converted to SI units where this is feasible, except for pipe sizes which continue to be expressed in inches. These are nominal dimensions by which the pipe is known in the trade and the exact dimensions may vary with different pipe materials. Until there is general acceptance of a uniform nominal size for such piping, the pipe size is expressed in inches to avoid confusion.

Enquiries regarding this document should be directed to: The Director, Building Standards Branch, Ministry of Municipal Affairs, Parliament Buildings, Victoria, British Columbia, V8V 1X4

**NOTE:** The text and illustrations that make up the explanatory material for Section 5 Venting Systems are contained within a box in order to visually separate the text of the Code itself from the explanatory material.

Illustrations contained in Section 5 are by the Plumbing Department of the British Columbia Institute of Technology.



## SECTION 1 GENERAL REQUIREMENTS AND ADMINISTRATION

### SUBSECTION 1.1 APPLICATION

1.1.1. This Code applies to the design, construction, extension, alteration, renewal or repair of *plumbing systems*.

### SUBSECTION 1.2 SCOPE

Scope

- \* 1.2.1. This Code specifies the minimum requirements for (a) *drainage systems* for water-borne wastes and *storm water* for buildings to the point of connection with public services or other acceptable disposal point, (b) *venting systems*, (c) *water service pipes*, and (d) *water distribution systems*.

### SUBSECTION 1.3 DEFINITIONS AND ABBREVIATIONS

Definitions

1.3.1. Definitions of words and phrases used in this Code that are not included in the list of definitions in this Section shall have the meanings which are commonly assigned to them in the context in which they are used in this Code, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

1.3.2. The words and terms in italics in this Code shall have the following meanings:

- \* *Acceptable* means acceptable to the *authority having jurisdiction*.
- \* *Accepted* means accepted by the *authority having jurisdiction*.
- \* *Accessible* means when applied to a *fixture*, connection, appliance, valve, *cleanout* or equipment, having access thereto but which first may require the removal of an access panel, door or similar obstruction.
- Air break* means the unobstructed distance between the lowest point of an indirect *drainage system* and the *flood level rim* of the *fixture* into which it discharges. (See Appendix explaining Sentence 3.3.11.(2).)
- Air gap* means the unobstructed vertical distance through air between the lowest point of a water supply outlet and the *flood level rim* of the *fixture* or device into which the outlet discharges. (See Appendix explaining Sentence 6.2.3.(2).)
- \* *Alarm check valve* means an *acceptable* valve used to isolate a fire protection system from a *water service pipe*.
- Alloy zinc* means an alloy of zinc having the corrosion resistance and physical properties of an alloy containing 0.15 per cent titanium, 0.74 per cent copper and 99.11 per cent zinc, and so tempered as to be capable of being formed into the shape required for a watertight joint.
- \* *Atmospheric vacuum breaker* means an *acceptable* device that prevents *back-siphonage*.
- \* *Authority having jurisdiction* means the governmental body responsible for the enforcement of any part of this Code or the official or agency designated by that body to exercise such a function.
- Backflow* means a flowing back or reversal of the normal direction of the flow.
- Backflow preventer* means a device or a method that prevents *backflow*. (See Appendix.)
- \* *Back pressure* means *backflow* caused by a higher downstream pressure than the supply pressure.
- \* *Back-siphonage* means *backflow* caused by atmospheric pressure. (See Appendix.)
- Backwater valve* means a *check valve* designed for use in a gravity *drainage system*.
- \* *Bathroom group private* means one lavatory basin, one flush tank water closet and one bath tub or maximum 2 head shower drain.
- \* *Bathroom group public* means one lavatory basin, one direct flush valve water closet and one bath tub or maximum 2 head shower drain.
- Branch* means a *soil or waste pipe*, connected at its upstream end at the junction or 2 or more *soil or waste pipes* or to a *soil or waste stack* and connected at its downstream end to another *branch*, a sump, a *soil or waste stack* or a *building drain* (See Appendix explaining definition of *drainage system*.)

- Branch vent* means a *vent pipe* that is connected at its lower end to the junction of 2 or more *vent pipes*, and is connected at its upper end either to a *stack vent*, *vent stack* or *header*, or is terminated in open air. (See Appendix.)
- Building* means any structure used or intended for supporting or sheltering any use or occupancy.
- Building drain* means the horizontal piping, including any vertical offset that conducts *sewage*, *clear-water waste* or *storm water* to a *building sewer*. (See Appendix explaining definition for drainage system.)
- Building sewer* means a pipe that is connected to a *building drain* 1 m outside a wall of a building and that leads to a public sewer or private *sewage disposal system*.
- Building trap* means a *trap* that is installed in a *building drain* or *building sewer* to prevent circulation of air between a *drainage system* and a public sewer. (See Appendix explaining Sentence 4.5.4.(1).)
- Check valve* means a valve that permits flow in one direction but prevents a return flow.
- \* *Check valve with atmospheric port* means an acceptable assembly of check valves and an atmospheric port.
- Circuit vent* means a *vent pipe* that serves a number of *fixtures* and connects to the *fixture drain* of the most upstream *fixture*. (See Appendix.)
- \* *Cleanout* (as applying to plumbing systems) means an acceptable fitting or manhole that is intended to provide access to a pipe or trap to permit cleaning and inspection services.
- Clear water waste* means waste water with impurity levels that will not be harmful to health and may include cooling water and condensate drainage from refrigeration and air conditioning equipment and cooled condensate from steam heating systems, but does not include *storm water*. (See Appendix A.)
- Combined building drain* means a *building drain* that is intended to conduct *sewage* and *storm water*.
- Combined building sewer* means a *building sewer* that is intended to conduct *sewage* and *storm water*.
- Combined sewer* means a sewer that is intended to conduct *sewage* and *storm water*.
- Combustible\** means that a material fails to meet the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Noncombustibility in Building Materials."
- Continuous vent* means a *vent pipe* that is an extension of a vertical section of a *branch* or *fixture drain*.
- Critical level* means the level of submergence at which the *back-siphonage* preventer ceases to prevent *back-siphonage*.
- Dead end* means a pipe that terminates with a closed fitting.
- Developed length* means the length along the centre line of the pipe and fittings. (See Appendix explaining Sentence 5.6.3.(1).)
- Directly connected* means physically connected in such a way that water or gas cannot escape from the connection.
- \* *Double check valve* means an acceptable assembly of shutoff valves, check valves and test cocks.
- Drainage system* means an assembly of pipes, fittings, *fixtures*, *traps* and appurtenances that is used to convey *sewage*, *clear-water waste* or *storm water* to a public sewer or a private *sewage disposal system*, but does not include *subsoil drainage pipes*. (See Appendix.)
- Dual vent* means a *vent pipe* that serves 2 *fixtures* and connects at the junction of the *fixture drains*. (See Appendix explaining definition for *drainage system*.)
- Dwelling unit* means a suite operated as a housekeeping unit used or intended to be used as a domicile by 1 or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.
- \* *Emergency floor drain* means a *fixture* for the purpose of overflow protection. It does not receive the regular discharge from other *fixtures*, appliances or devices.
- Fire Separation\** means a construction assembly that acts as a barrier against the spread of fire.
- \* *Fire stop* means a draft-tight barrier within or between construction assemblies that acts to retard the passage of smoke and flame.
- Fixture* means a receptacle, appliance, apparatus or other device that discharges *sewage* or *clear-water waste*, and includes a floor drain.

- Fixture drain* means the pipe that connects a *trap* serving a *fixture* to another part of a *drainage system*. (See Appendix.)
- Fixture outlet pipe* means a pipe that connects the waste opening of a *fixture* to the *trap* serving the *fixture*. (See Appendix.)
- Fixture unit* (as applying to *drainage systems*) means the unit of measure based on the rate of discharge, time of operation and frequency of use of a *fixture* that expresses the hydraulic load that is imposed by that *fixture* on the *drainage system*.
- Fixture unit* (as applying to *water distribution systems*) means the unit of measure based on the rate of supply, time of operation and frequency of use of a *fixture* or outlet that expresses the hydraulic load that is imposed by that *fixture* or outlet on the supply system.
- Flood level rim* means the top edge at which water can overflow from a *fixture* or device. (See Appendix explaining definition for *back-siphonage*.)
- Flow control roof drain* means a *roof drain* that restricts the flow of *storm water* into the *storm drainage system*.
- Fresh air inlet* means a *vent pipe* that is installed in conjunction with a *building trap* that terminates outdoors. (See Appendix explaining Sentence 4.5.4.(1).)
- Header* means a *vent pipe* that connects 2 or more *vent stacks* or *stack vents* to outdoors. (See Appendix.)
- Indirectly connected* means not directly connected. (See Appendix explaining Sentence 3.3.11.(2).)
- Individual vent* means a *vent pipe* that serves 1 *fixture*.
- Interceptor* means a receptacle that is installed to prevent oil, grease, sand or other materials from passing into a *drainage system*.
- Leader* means a pipe that is installed to carry *storm water* from a roof to a *storm building drain* or sewer or other place of disposal.
- \* *Loop vent* (see *circuit vent*). (See Appendix explaining definition for *drainage system*.)
- Nominally horizontal* means at an angle of less than 45 degrees with the horizontal. (See Appendix.)
- Nominally vertical* means at an angle of not more than 45 degrees with the vertical. (See Appendix.)
- Noncombustible\** means that a material meets the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Non-Combustibility in Building Materials."
- Occupancy* means the use or intended use of a *building* or part thereof for the shelter or support of persons, animals or property.
- Offset* means the piping that connects the ends of 2 pipes that are parallel. (See Appendix.)
- \* *Permit* means permission or authorization in writing by the authority having jurisdiction to perform work regulated by this Code and, in the case of an occupancy permit, to occupy any *building* or part thereof.
- Plumbing system* means a *drainage system*, a *venting system* and a *water system* or parts thereof. (See Appendix.)
- Potable* means safe for human consumption.
- \* *Pressure vacuum breaker* means an acceptable assembly of shutoff valves, *check valves*, test cocks and a vacuum relief valve.
- Private sewage disposal system* means a privately owned plant for the treatment and disposal of *sewage* (such as a septic tank with an absorption field).
- \* *Private use or private* (for the classification of *plumbing fixtures*) means *plumbing fixtures* in residences and apartments, in private bathrooms in hotels and hospitals, in restrooms in commercial establishments containing restricted-use single *fixtures* or groups of single *fixtures*, and to similar installations where the *fixtures* are intended for the use of a family or an individual.
- Private water supply system* means an assembly of pipes, fittings, valves, equipment and appurtenances that supplies water from a private source to a *water distribution system*.
- \* *Public use* (as applied to toilet rooms and bathrooms) means such rooms used by employees, occupants, visitors or patrons in or about any public premises; and to toilet rooms and bathrooms which may be kept locked but where several occupants or employees possess keys for and have access to the rooms.

- \* *Reduced pressure backflow preventer* means an acceptable assembly of shutoff valves, check valves, test cocks and a pressure differential relief valve. (See Appendix for backflow preventers.)
- Relief vent* means an auxiliary vent which provides additional circulation of air between drainage systems and venting systems.
- Riser* means a water distribution pipe that extends through at least 1 full storey.
- Roof drain* means a fitting or device that is installed in the roof to permit storm water to discharge into a leader.
- Roof gutter* means an exterior channel installed at the base of a sloped roof to convey storm water.
- Sanitary building drain* means a building drain that conducts sewage.
- Sanitary building sewer* means a building sewer that conducts sewage.
- Sanitary drainage system* means a drainage system that conducts sewage.
- Sanitary sewer* means a sewer that conducts sewage.
- \* *Service water heater* means a system for the heating of water for a water distribution system.
- Sewage* means any liquid waste other than clear water waste or storm water.
- Size* means the nominal diameter by which a pipe, fitting, trap or other similar item is commercially designated.
- Soil-or-waste pipe* means a pipe in a sanitary drainage system.
- Soil-or-waste stack* means a vertical soil-or-waste pipe that passes through 1 or more storeys, and includes any offset that is part of the stack.
- Stack vent* means a vent pipe that connects the top of a soil-or-waste stack to a header or open air. (See Appendix explaining definition for drainage system.)
- Storey* (as applying to plumbing) means the interval between 2 successive floor levels including mezzanine floors that contain plumbing fixtures or between a floor level and roof.
- Storm building drain* means a building drain that conveys storm water.
- Storm building sewer* means a building sewer that conveys storm water.
- Storm drainage system* means a drainage system that conveys storm water.
- Storm sewer* means a sewer that conveys storm water.
- Storm water* means water that is discharged from a surface as a result of rainfall or snowfall.
- Subdrainage system* means a drainage system that does not drain by gravity to the building sewer.
- Subsoil drainage pipe* means a pipe that is installed underground to intercept and convey subsurface water.
- Suite* means a single room or series of rooms of complementary use, operated under a single tenancy and includes dwelling units, individual guest rooms in motels, hotels, boarding houses, rooming houses and dormitories as well as individual stores and individual or complementary rooms for business and personal service occupancies.
- Trap* means a fitting or device that is designed to hold a liquid seal that will prevent the passage of gas but will not materially affect the flow of a liquid.
- Trap arm* means the portion of a fixture drain between the trap weir and the vent pipe fitting. (See Appendix explaining Sentence 5.6.3.(1).)
- Trap dip* means the lowest part of the upper interior surface of a trap.
- Trap seal depth* means the vertical distance between the trap dip and the trap weir. (See Appendix explaining Sentence 2.3.1.(1).)
- Trap standard* means the trap for a fixture that is integral with the support for the fixture.
- Trap weir* means the highest part of the lower interior surface of a trap. (See Appendix explaining Sentences 2.3.1.(1) and (2).)
- Vent pipe* means a pipe that is a part of a venting system.
- Vent stack* means a vent pipe that is connected at its upper end to a header or is terminated in open air and that is used to limit pressure differential in a soil-or-waste stack. (See Appendix explaining definition for drainage system.)
- Venting system* means an assembly of pipes and fittings that connects a drainage system with outside air for circulation of air and the protection of trap seals in the drainage system. (See Appendix explaining definition for drainage system.)
- Waste pipe* (see Soil-or-waste pipe).
- Water distribution system* means an assembly of pipes, fittings, valves and appurtenances that conveys water from the water service pipe or private water supply system to water supply outlets, fixtures, appliances and devices.

*Water service pipe* means a pipe that conveys water from a public water main or private water source to the inside of the building.

*Water system* means a private water supply system, a water service pipe, a water distribution system or parts thereof.

\* *Wet vent* means a vent pipe that also serves as a soil-or-waste pipe. (See Appendix explaining Article 5.2.1.)

*Yoke vent* means a vent pipe that is connected at its lower end to a soil-or-waste stack and at its upper end to a vent stack or a branch vent that is connected to a vent stack.

**1.3.3. Abbreviations in this Code for the names of organizations or authorities have the following meanings:**

|              |                                                                                                                                                                                                                                                                      |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACNBC.....   | Associate Committee on the National Building Code<br>(National Research Council of Canada<br>Ottawa, Ontario K1A 0R6)                                                                                                                                                |
| ANSI.....    | American National Standards Institute,<br>(1430 Broadway,<br>New York, N.Y., U.S.A. 10018)                                                                                                                                                                           |
| ASHRAE.....  | American Society of Heating, Refrigerating and Air-Conditioning<br>Engineers<br>(1791 Tullie Circle, N.E., Atlanta, Georgia 30329 U.S.A.)                                                                                                                            |
| * ASPE ..... | American Society of Plumbing Engineers<br>(3617 Thousand Oaks Blvd., Suite 210<br>Westlake, California, U.S.A. 91361)                                                                                                                                                |
| ASTM .....   | American Society for Testing and Materials<br>(1916 Race Street,<br>Philadelphia, Pa. 19103 U.S.A.)                                                                                                                                                                  |
| CAN .....    | National Standard of Canada designation (The number following the<br>CAN designation represents the agency under whose auspices the stan-<br>dard is issued.<br>CAN 1 designates CGA<br>CAN 2 designates CGSB<br>CAN 3 designates CSA, and<br>CAN 4 designates ULC.) |
| CGA .....    | Canadian Gas Association<br>(55 Scarsdale Road,<br>Don Mills, Ontario M3B 2R3)                                                                                                                                                                                       |
| CGSB .....   | Canadian General Standards Board<br>(Jeanne-Mance Building, Tunney's Pasture, Ottawa, Ontario<br>K1A 1G6)                                                                                                                                                            |
| CSA .....    | Canadian Standards Association<br>(178 Rexdale Blvd., Rexdale, Ontario M9W 1K3)                                                                                                                                                                                      |
| NBC.....     | National Building Code of Canada<br>(National Research Council of Canada<br>Ottawa, Ontario K1A 0R6)                                                                                                                                                                 |
| ULC.....     | Underwriters' Laboratories of Canada<br>(7 Crouse Road, Scarborough, Ontario M1R 3A9)                                                                                                                                                                                |

Abbreviations

**1.3.4. Abbreviations of words and phrases in this Code have the following meanings:**

|                         |                                   |                      |                       |
|-------------------------|-----------------------------------|----------------------|-----------------------|
| ABS.....                | acrylonitrile-butadiene-styrene   | L/s .....            | litres per second     |
| cm <sup>2</sup> .....   | square centimetre(s)              | m .....              | metre(s)              |
| CPVC.....               | chlorinated poly (vinyl chloride) | m <sup>2</sup> ..... | square metre(s)       |
| ° .....                 | degree(s)                         | max .....            | maximum               |
| °C.....                 | degree(s) Celsius                 | min .....            | minimum               |
| diam.....               | diameter                          | min .....            | minute(s)             |
| h .....                 | hour(s)                           | mm .....             | millimetre(s)         |
| in. ....                | inch(es)                          | NA .....             | not applicable        |
| kg/m <sup>2</sup> ..... | kilograms per square metre        | No .....             | number(s)             |
| kPa .....               | kilopascal(s)                     | PVC.....             | poly (vinyl chloride) |
| L .....                 | litre(s)                          | temp.....            | temperature           |

## SUBSECTION 1.4 EQUIVALENTS

- \* 1.4.1.(1) Any person desirous of using a material or method of design as an equivalent to the requirement of this Code shall submit to the provincial *authority having jurisdiction* sufficient evidence to satisfy the provincial *authority having jurisdiction* that the proposed equivalent will provide the *acceptable* level of performance required by this Code.
- \* 1.4.2.(1) *Acceptable* levels of performance shall be deemed to be:
  - (a) in *sanitary drainage and venting systems*, pressure variations of not more than plus or minus 25 mm water column;
  - (b) in *storm building sewers*, the design shall provide adequate drainage without undue flooding based on the ten-year storm data provided by the *authority having jurisdiction*.
  - (c) in *water systems*, adequate flow and pressure to operate *fixtures* and devices and keep them in a sanitary condition.

## SUBSECTION 1.5 PLUMBING FACILITIES

- \* 1.5.1. Plumbing facilities shall be provided in accordance with Subsection 3.6.4. of Part 3 and Section 9.32 of Part 9 of the British Columbia Building Code 1985.

## SUBSECTION 1.6 SERVICE CONNECTIONS

Sanitary  
drainage  
systems

- 1.6.1.(1) Every *sanitary drainage system* shall be connected to a public *sanitary sewer*, a public *combined sewer* or a *private sewage disposal system*.

Storm  
drainage  
systems

- \* (2) A *combined building drain* shall not be installed unless *acceptable*.

Water  
distribution  
systems

- 1.6.2. Every *storm drainage system* shall be connected to a public *storm sewer*, public *combined sewer* or a designated storm water disposal location.

- \* 1.6.3. Every *water distribution system* shall be connected to a public water main, a *potable private water supply system* or other *acceptable* source of water.

## SUBSECTION 1.7 LOCATION OF FIXTURES

Location  
of fixtures

- \* 1.7.1.(1) Plumbing *fixtures* shall not be installed in a room that is not lighted and ventilated in accordance with the appropriate requirements in Parts 3 and 9 of the B.C. Building Code 1985.

- \* (2) When a water closet is installed for *public use* it shall be provided with a seat of the open front type.

Accessibility

- 1.7.2. Every *fixture*, appliance, *interceptor*, *cleanout*, valve, device or piece of equipment shall be so located that it is readily *accessible* for use, cleaning and maintenance.

## SUBSECTION 1.8 PLUMBING DRAWINGS AND RELATED DOCUMENTS

Plumbing  
drawings  
and  
related  
documents

- 1.8.1.(1) Plumbing drawings and related documents submitted with the application for a plumbing *permit* shall show

- (a) location and size of every *building drain*, *building sewer* and every *trap* and *cleanout* that is on a *building drain*, or *building sewer*,
- (b) The size and location of every *soil-or-waste pipe*, *trap*, *cleanout* and *vent pipe*, and
- (c) a layout of the *potable water distribution system*, including pipe sizes and valves.

## \* SUBSECTION 1.9 INSPECTION AND TESTING

Reinspection of  
existing systems

- 1.9.1.(1) The *authority having jurisdiction* may inspect an existing *plumbing system*, and where there is reason to suspect that the system is not satisfactory, order it to be tested.

(2) If any part of the system has become or is in a condition that it may become dangerous or injurious to health, the owner shall make any alteration or replacement ordered in writing by the authority having jurisdiction.

#### SUBSECTION 1.10 REFERENCED DOCUMENTS

**1.10.1.** In the case of conflict between the provisions of this code and those of a referenced document, the provisions of this Code shall govern.

**1.10.2.** Unless otherwise specified herein, the documents referenced in this Code shall include all amendments, revisions and Supplements effective to 30 June 1984.

**1.10.3.** Where standards are referenced in this Code, they shall be the editions designated in Table 1.10.A.

Referenced  
documents

**Table 1.10.A.**  
Forming part of Article 1.10.3.

#### Documents Referenced in the British Columbia Plumbing Code 1985

| Issuing Agency | Document Number | Title of Document                                                                     | Code Reference         |
|----------------|-----------------|---------------------------------------------------------------------------------------|------------------------|
| ANSI           | B16.3-1977      | Malleable-Iron Threaded Fittings, 150 and 300 lb.                                     | 2.6.6.(1)              |
| ANSI           | B16.4-1977      | Cast-Iron Threaded Fittings, 125 and 250 lb.                                          | 2.6.5.(1)              |
| ANSI           | B16.12-1983     | Cast-Iron Threaded Drainage Fittings                                                  | 2.6.3.(1)              |
| ANSI           | B16.15-1978     | Cast Bronze Threaded Fittings, Class 125 and 250                                      | 2.7.3.(1)              |
| ANSI           | B16.18-1984     | Cast Copper Alloy Solder-Joint Pressure Fittings                                      | 2.7.6.(1)<br>2.7.6.(2) |
| ANSI           | B16.22-1980     | Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings                        | 2.7.6.(1)              |
| ANSI           | B16.24-1979     | Bronze Pipe Flanges and Flanged Fittings, 150 and 300 lb.                             | 2.7.2.                 |
| ANSI           | B16.26-1983     | Cast Copper Alloy Fittings for Flared Copper Tubes                                    | 2.7.7.(1)<br>2.7.7.(2) |
| ANSI           | B16.29-1980     | Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings-F'WV           | 2.7.5.(1)              |
| ANSI/AWWA      | C104/A21.4-80   | Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water       | 2.6.4.(2)              |
| ANSI/AWWA      | C106/A21.6-80   | Gray-Iron Pipe Centrifugally Cast in Metal Molds, for Water or Other Liquids          | 2.6.4.(1)              |
| ANSI/AWWA      | C110/A21.10-82  | Gray-Iron and Ductile-Iron Fittings, 3 in. Through 48 in. for Water and Other Liquids | 2.6.4.(3)              |
| ANSI/AWWA      | C111/A21.11-80  | Rubber Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings        | 2.6.4.(4)              |
| Column 1       | 2               | 3                                                                                     | 4                      |

Table 1.10.A. (Cont'd)

| Issuing Agency | Document Number | Title of Document                                                                                   | Code Reference |
|----------------|-----------------|-----------------------------------------------------------------------------------------------------|----------------|
| ANSI/AWWA      | C151/A21.51-81  | Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids | 2.6.4.(1)      |
| ASTM           | A53-84a         | Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless                                  | 2.6.7.(4)      |
| ASTM           | B32-83          | Solder Metal                                                                                        | 2.8.3.(2)      |
| ASTM           | B42-84a         | Seamless Copper Pipe, Standard Sizes                                                                | 2.7.1.(1)      |
| ASTM           | B43-84a         | Seamless Red Brass Pipe, Standard Sizes                                                             | 2.7.1.(2)      |
| ASTM           | B88-83a         | Seamless Copper Water Tube                                                                          | 2.7.4.(1)      |
| ASTM           | B306-83a        | Copper Drainage Tube (DWV)                                                                          | 2.7.4.(1)      |
| ASTM           | D2466-78        | Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40                                       | 2.5.6.(2)      |
| ASTM           | D2467-76a       | Socket-Type Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 80                           | 2.5.6.(2)      |
| ASTM           | D2564-84        | Solvent Cements for Poly (Vinyl Chloride)(PVC) Plastic Pipe and Fittings                            | 2.5.6.(3)      |
| ASTM           | D2609-74        | Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe                                          | 2.5.5.(3)      |
| ASTM           | D3261-84        | Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing   | 2.5.5.(4)      |
| CGSB           | 34-GP-1M-1976   | Pipe, Asbestos Cement, Pressure                                                                     | 2.5.2.(1)      |
| CGSB           | 34-GP-9M-1975   | Pipe, Asbestos Cement, Sewer                                                                        | 2.5.1.(2)      |
| CGSB           | 34-GP-22M-1976  | Pipe, Asbestos Cement, Drain                                                                        | 2.5.1.(1)      |
| CGSB           | 34-GP-23M-1976  | Pipe, Asbestos Cement, Sewer, House Connection                                                      | 2.5.1.(2)      |
| CGSB           | 77-GP-1M-1977   | Caulking Compound, Cementitious Type, Cold Applied, for Pipe Joints                                 | 2.8.2.         |
| CGA            | CAN1-4.4-M80    | Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves              | 2.9.10         |
| CSA            | A60.1-M1976     | Vitrified Clay Pipe                                                                                 | 2.5.4.(1)      |
| CSA            | A60.3-M1976     | Vitrified Clay Pipe Joints                                                                          | 2.5.4.(2)      |
| CSA            | A257.1-M1982    | Concrete Sewer, Storm Drain and Culvert Pipe                                                        | 2.5.3.(1)      |
| Column 1       | 2               | 3                                                                                                   | 4              |

Table 1.10.A. (Cont'd)

| Issuing Agency | Document Number | Title of Document                                                                               | Code Reference         |
|----------------|-----------------|-------------------------------------------------------------------------------------------------|------------------------|
| CSA            | CAN3-B45.0-M81  | General Requirements for Plumbing Fixtures                                                      | 2.2.2.(1)              |
| CSA            | A257.2-M1982    | Reinforced Concrete Culvert, Storm Drain and Sewer Pipe                                         | 2.5.3.(1)              |
| CSA            | A257.3-M1982    | Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets                        | 2.5.3.(2)              |
| CSA            | CAN3-B45.0-M81  | General Requirements for Plumbing Fixtures                                                      | 2.2.2.(1)              |
| CSA            | CAN3-B45.1-M81  | Vitreous China Plumbing Fixtures                                                                | 2.2.2.(2)              |
| CSA            | CAN3-B45.2-M81  | Enamelled Cast Iron Plumbing Fixtures                                                           | 2.2.2.(3)              |
| CSA            | CAN3-B45.3-M81  | Porcelain Enamelled Steel Plumbing Fixtures                                                     | 2.2.2.(4)              |
| CSA            | CAN3-B45.4-M81  | Stainless Steel Plumbing Fixtures                                                               | 2.2.2.(5)              |
| CSA            | CAN3-B45.5-M81  | Plastic Plumbing Fixtures                                                                       | 2.2.2.(6)              |
| CSA            | B64.0-1976      | Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers | 2.9.9.(1)              |
| CSA            | B64.1.1-1976    | Vacuum Breakers — Atmospheric Type                                                              | 2.9.9.(1)              |
| CSA            | B64.1.2-1979    | Vacuum Breakers — Pressure Type                                                                 | 2.9.9.(1)              |
| CSA            | B64.2-1976      | Vacuum Breakers — Hose-Connection Type                                                          | 2.9.9.(1)              |
| CSA            | B64.3-1976      | Backflow Preventers — Superior-Pressure Principle Type                                          | 2.9.9.(1)              |
| CSA            | B64.4-1976      | Backflow Preventers — Reduced-Pressure Principle Type                                           | 2.9.9.(1)              |
| CSA            | B64.5-1976      | Backflow Preventers — Double-Check-Valve Type                                                   | 2.9.9.(1)              |
| CSA            | B67-1972        | Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories                                     | 2.7.8.(1)<br>2.8.3.(1) |
| CSA            | B70-M86         | Cast Iron Soil Pipe, Fittings and Means of Joining                                              | 2.6.1.(1)<br>2.6.2.    |
| CSA            | B125-1975       | Plumbing Fittings                                                                               | 2.9.6.<br>2.9.9.(2)    |
| CSA            | B127.1-M1977    | Components for Use in Asbestos Cement, Drain, Waste and Vent Systems                            | 2.5.1.(1)              |
| CSA            | B127.2-M1977    | Components for Use in Asbestos Cement Building Sewer Systems                                    | 2.5.1.(2)              |
| Column 1       | 2               | 3                                                                                               | 4                      |

Table 1.10.A. (Cont'd)

| Issuing Agency | Document Number | Title of Document                                                                      | Code Reference          |
|----------------|-----------------|----------------------------------------------------------------------------------------|-------------------------|
| CSA            | B137.1-M1983    | Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services                | 2.5.5.(1)               |
| CSA            | B137.3-M1981    | Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications                       | 2.5.6.(1)               |
| CSA            | B137.6-M1983    | CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems             | 2.5.7.(1)               |
| CSA            | B137.8-M1977    | Polybutylene (PB) Piping for Hot and Cold Water Distribution Systems                   | 2.5.8.                  |
| CSA            | B158.1-1976     | Cast Brass Solder Joint Drainage, Waste and Vent Fittings                              | 2.7.5.(1)<br>2.9.1.     |
| CSA            | B181.1-1973     | Acrylonitrile-Butadiene-Styrene Drain, Waste and Vent (ABS-DWV) Pipe and Pipe Fittings | 2.5.9.(1)<br>2.5.10.(1) |
| CSA            | CAN3-B181.2-M85 | Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings                     | 2.5.9.(1)<br>2.5.10.(1) |
| CSA            | B182.1-M1983    | Plastic Drain and Sewer Pipe and Pipe Fittings                                         | 2.5.9.(1)               |
| CSA            | B242-M1980      | Groove and Shoulder Type Mechanical Pipe Couplings                                     | 2.9.4.                  |
| *CSA           | CAN3-B281-M85   | Aluminum Drain, Waste, and Vent Pipe and Components                                    | 2.7.9.(1)<br>2.7.9.(3)  |
| *C.I.S.P.I.    | 301-85          | Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems                | 2.6.1.(1)(b)            |
| CSA            | CAN3-G401-M81   | Corrugated Steel Pipe Products                                                         | 2.6.8.(1)               |
| ULC            | CAN4-S114-M80   | Standard Method of Test for Determination of Non-Combustibility in Building Materials  | 1.3.2.                  |
| Column 1       | 2               | 3                                                                                      | 4                       |

## SECTION 2 MATERIALS AND EQUIPMENT

### SUBSECTION 2.1 GENERAL

\* 2.1.1. In addition to the requirements of this subsection, the appropriate requirements of Part 2 of the British Columbia Building Code 1985 shall apply.

2.1.2. All materials, systems and equipment installed to meet the requirements of this Code shall be free from defects and possess the necessary characteristics to perform their intended functions when installed.

Defects in  
products and  
materials

2.1.3.(1) Where unusual conditions exist such as excessively corrosive soil or water, only materials suited for use in such locations shall be used.

Exposure of  
materials

\* (2) Materials and equipment used in a *drainage system* where excessively corrosive wastes are present shall be suitable for the purpose.

2.1.4.(1) Used materials and equipment, including *fixtures*, shall not be reused unless they meet the requirements of this Code for new materials and equipment and are otherwise satisfactory for the intended use.

Restriction  
on re-use

(2) Materials and equipment that have been used for a purpose other than the distribution of *potable water* shall not be subsequently used in a *potable water system*.

2.1.5. Every length of pipe and every fitting shall have cast, stamped or indelibly marked on it the maker's name or mark and the weight or class or quality of the product, or it shall be marked in accordance with the relevant standard, and such markings shall be visible after installation.

Identification

2.1.6. Where the term "pipe" or "piping" is used, it shall also apply to "tube" or "tubing" unless otherwise stated.

\* 2.1.7.(1) Except as provided in Sentence (2) the working pressure rating of a *water service pipe* shall not be less than the maximum public water main pressure at the point of connection as established by the *authority having jurisdiction*.

Working  
pressure

\* (2) Where a *water service pipe* pressure is controlled by an *accepted* pressure reducing device, the *water service pipe* rated working pressure shall not be less than that of the reduced pressure.

2.1.8. Piping, fittings and joints used in pressure sewer, force main or sump pump discharge applications shall be capable of withstanding not less than one and one-half times the maximum potential pressure.

### SUBSECTION 2.2 FIXTURES

2.2.1. Every *fixture* shall have a smooth, hard corrosion-resistant surface free from flaws and blemishes that may interfere with cleaning.

2.2.2.(1) Every *fixture* shall conform to CAN3-B45.0, "General Requirements for Plumbing Fixtures" as applicable.

2.2.2.(2) Every vitreous china *fixture* shall conform to CAN 3-B45.1, "Vitreous China Plumbing Fixtures".

(3) Every enamelled cast iron *fixture* shall conform to CAN 3-B45.2, "Enamelled Cast Iron Plumbing Fixtures."

(4) Every porcelain enamelled steel *fixture* shall conform to CAN 3-B45.3, "Porcelain Enamelled Steel Plumbing Fixtures."

(5) Every stainless steel *fixture* shall conform to CAN 3-B45.4, "Stainless Steel Plumbing Fixtures."

(6) Every plastic *fixture* shall conform to CAN 3-B45.5, "Plastic Plumbing Fixtures."

Site constructed  
fixtures

\* 2.2.3.(1) Every shower receptor, bathtub or similar sanitary *fixture* constructed on site shall function for its intended use and shall be designed to maintain a sanitary condition. The construction of such a *fixture* shall be as follows or as otherwise *accepted*:

- (a) the *fixture* base shall have an *acceptable* waterproof liner extending to 75 mm above the finished *flood level rim*.
- (b) liners constructed of lead sheeting shall have the upper surface protected by two coats of asphalt if placed on wood and all surfaces protected if placed on concrete.
- (c) the *fixture* shall have *acceptable* surface and sub-surface drainage installed to allow all water to drain from the pan.
- (d) the liner shall be water tested to the *flood level rim*.
- (e) the sub-surface drainage weep-holes shall be provided with protection against blockage.
- (f) the minimum usable area shall be 580 000 sq. mm with no dimension less than 750 mm.
- (g) no material that may be harmed by moisture shall be used inside the liner.
- (h) a shower door shall not open into the shower stall.
- (i) except for *fixtures* designed for handicapped persons, the depth of the shower shall be not less than 75 mm and not more than 230 mm measured from the top of the finished receptor floor to the *flood level rim*.

**EXCEPTIONS:** The preceding clauses do not apply to hot-tubs, recreational pools, *acceptable fixtures* or *fixtures* built on slab on grade in single family dwellings where the base is of concrete construction and the floor and curb walls are monolithic.

- (2) Not more than 6 shower heads shall be served by a single shower drain.
- (3) Where 2 or more heads are served by a shower drain, the floor shall be sloped and the drain located so that water from one head cannot flow into the area that serves another head. (See Appendix.)
- (4) Except for column showers, when a battery of shower heads is installed, the horizontal distance between 2 adjacent shower heads shall be at least 750 mm.

2.2.4. A dishwashing sink and a food preparation sink shall not have concealed overflows. (See Appendix A.)

Construction  
of water  
closet bowl

\* 2.2.5. Every water closet bowl or urinal made of other than vitreous china shall comply with the applicable requirements of CAN 3-B45.1, "Vitreous China Plumbing Fixtures."

### SUBSECTION 2.3 TRAPS AND INTERCEPTORS

Traps

2.3.1.(1) Every *trap* shall:

- \* (a) have a *trap seal depth* of at least 38 mm and not more than 100 mm, unless *accepted*,
- (b) be so designed that failure of the seal walls will cause exterior leakage, and
- (c) have a water seal that does not depend on the action of moving parts.
- (2) Every *trap* that serves a lavatory, a sink or a laundry tray shall:
  - (a) be provided with a *cleanout* plug located at the lowest point of the *trap* and of the same material as the *trap*, except that a cast-iron *trap* shall be provided with a brass *cleanout* plug, or
  - (b) be designed so that part of the *trap* can be completely removed by screwed connections for cleaning purposes. (See Appendix.)

(3) A bell trap shall not be installed in a *drainage system*. (See Appendix.)

(4) A drum trap shall not be used as a *fixture trap* unless required to serve as an *interceptor* and access for servicing is provided.

\* (5) Tubular metal or plastic traps that conform to CSA Standard B.125 "Plumbing Fittings", shall only be used in an *accessible* location.

2.3.2.(1) Every *interceptor* shall be designed so that it can be readily cleaned.

Interceptors

(2) Every grease *interceptor* shall be designed so that it does not become air bound and it shall not have a water jacket.

## SUBSECTION 2.4 PIPE FITTINGS

2.4.1.(1) A T fitting shall not be used in a *drainage system* except to connect a *vent pipe*.

T and cross fittings

(2) A cross fitting shall not be used in a *drainage system*. (See Appendix.)

\* 2.4.2.(1) A single or double sanitary T fitting shall not be used in a *nominally horizontal soil-or-waste pipe*, except that a single sanitary T fitting may be used to connect a dry vent pipe.

(2) A double sanitary T fitting shall not be used to connect the *trap arms* of

(a) back outlet water closets installed back-to-back, or

(b) 2 urinals where no *cleanout* fitting is provided above the connection.

\* 2.4.3.(1) In the direction of flow from horizontal to horizontal or from vertical to horizontal, changes of direction shall be accomplished with a fitting or combination of fittings that provide a bend that has a centre line radius that is not less than twice the diameter of the piping served.

(2) a  $\frac{1}{4}$  bend that has a centre-line radius that is less than the *size* of the pipe shall not be used to join 2 *soil-or-waste pipes*.

Quarter bend

2.4.4. A *sisson* fitting shall not be installed in a *nominally horizontal soil-or-waste pipe*.

Sisson fitting

## SUBSECTION 2.5 NON-METALLIC PIPE AND FITTINGS

(For a summary of pipe applications see Appendix.)

2.5.1.(1) Except as provided in Sentence (2), asbestos-cement pipe and its fittings for use in a drain, waste or vent system shall conform to:

Asbestos-cement drainage pipe and fittings

(a) CGSB 34-GP-22M, "Pipe Asbestos Cement, Drain," or

(b) CSA B127.1-M, "Components for Use in Asbestos Cement, Drain, Waste or Vent Systems."

\* (2) Asbestos-cement pipe and its fittings used underground outside a *building* shall conform to Sentence (1), or

(a) CGSB 34-GP-9M, "Pipe Asbestos Cement, Sewer."

(b) CGSB 34-GP-23M, "Pipe Asbestos Cement, Sewer, House Connection," or

(c) CSA B127.2-M, "Components for Use in Asbestos Cement Building Sewer Systems."

2.5.2.(1) Asbestos-cement water pipe, couplings and bends shall conform to CGSB 34-GP-1M, "Pipe, Asbestos Cement, Pressure."

Asbestos-cement water pipe and fittings

(2) Asbestos-cement water pipe shall not be used above ground.

2.5.3.(1) Concrete pipe shall conform to CSA A257.1, "Concrete Sewer, Storm Drain and Culvert Pipe" or CSA A257.2, "Reinforced Concrete Culvert, Storm Drain and Sewer Pipe" of CSA Series A257, "Standards for Concrete Pipe."

Concrete pipe

(2) Gasketed joints shall conform to CSA A257.3, "Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets" of CSA Series A257, "Standards for Concrete Pipe."

(3) Where joints are required in concrete pipe under a *building* they shall be gasketed.

\* (4) Concrete fittings fabricated on the site from lengths of pipe shall not be used unless *accepted*.

(5) Concrete pipe shall not be used inside a *building*.

2.5.4.(1) Vitrified clay pipe and fittings shall conform to CSA A60.1-M, "Vitrified Clay Pipe".

(2) Couplings and joints for vitrified clay pipe shall conform to CSA A60.3-M, "Vitrified Clay Pipe Joints."

(3) Vitrified clay pipe and fittings shall not be used except for an underground part of a *drainage system*.

Plastic pipe  
and fittings

2.5.5.(1) Polyethylene water pipe shall conform to CSA B137.1, "Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services."

(2) Polyethylene water pipe shall not be used except for a *water service pipe*.

(3) Insert fittings for use with polyethylene pipe shall conform to ASTM D2609, "Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe."

(4) Butt fusion fittings for polyethylene pipe shall conform to ASTM D3261, "Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing."

2.5.6.(1) PVC water pipe shall conform to CSA B137.3, "Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications."

(2) PVC water pipe fittings shall conform to ASTM D2466, "Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40" or ASTM D2467, "Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80."

(3) PVC solvent cements shall conform to ASTM D2564, "Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings."

(4) PVC water pipe and fittings in Sentences (1) and (2) shall not be used in a *hot water system*.

2.5.7.(1) CPVC hot and cold water pipe, fittings and solvent cements shall conform to CSA B137.6, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems."

(2) The design temperature and design pressure of a CPVC piping system shall conform to Table 2.5.A.

**Table 2.5.A.**  
Forming Part of Sentence 2.5.7.(2)

| MAXIMUM PERMITTED PRESSURE OF CPVC<br>PIPING AT VARIOUS TEMPERATURES |                                 |
|----------------------------------------------------------------------|---------------------------------|
| Maximum Temperature of Water, °C                                     | Maximum Permitted Pressure, kPa |
| 10                                                                   | 3350                            |
| 20                                                                   | 2900                            |
| 30                                                                   | 2500                            |
| 40                                                                   | 2100                            |
| 50                                                                   | 1700                            |
| 60                                                                   | 1300                            |
| 70                                                                   | 1000                            |
| 80                                                                   | 700                             |
| 90                                                                   | 500                             |
| 100                                                                  | 400                             |
| Column 1                                                             | Column 2                        |

**2.5.8.** Polybutylene pipe and its associated fittings shall conform to CSA B137.8, "Polybutylene (PB) Piping for Hot and Cold Water Distribution Systems."

**2.5.9.(1)** Except as restricted in Sentence (2) plastic pipe, fittings and solvent cement used underground outside a *building* or under a *building* in a *drainage system* shall conform to:

(a) CSA B181.1, "Acrylonitrile-Butadiene-Styrene Drain, Waste and Vent (ABS-DWV) Pipe and Pipe Fittings,"

(b) CSA B181.2, "Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings,"

(c) CSA B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings," or

\* (d) ASTM D3034-78 35-Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, for pipe over 6 in. size.

\* (2) Pipe and fittings conforming to clauses (c) and (d) shall not be used under a *building*.

**2.5.10.(1)** Plastic pipe, fittings and solvent cement used inside a *building* or under a *building* in a *drainage* or *venting system* shall conform to:

(a) CSA B181.1, "Acrylonitrile-Butadiene-Styrene Drain, Waste and Vent (ABS-DWV) Pipe and fittings," or

(b) CSA B181.2, "Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings."

**2.5.10.(2)** Requirements for *combustible* piping in relation to fire safety shall conform to Sentence 3.1.4.5.(5) and Sentence 3.1.7.3.(1) to Sentence 3.1.7.3.(4) of Part 3 and Articles 9.10.9.10. and 9.10.9.26. to 9.10.9.29. of Part 9 of the British Columbia Building Code 1985.

**2.5.10.(3)** Where *noncombustible* piping pierces a *fire separation* or a *fire stop*, the requirements for fire stopping of Subsection 3.1.9. of Part 3 and Articles 9.10.9.9. and 9.10.15.10. of Part 9 of the British Columbia Building Code 1985 shall apply.

## SUBSECTION 2.6 FERROUS PIPE AND FITTINGS

(For Summary of pipe applications see Appendix.)

\* **2.6.1.(1)** Drainage piping, vent piping and fittings made of cast iron shall be certified or listed by an *acceptable* agency and shall conform to:

(a) CSA B70, "Cast Iron Soil Pipe, Fittings, and Means of Joining," or

\* (b) Cast Iron Soil Pipe Institute Standard No. 301 "Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems" and are *acceptable* for sizes 2" diameter to 10" diameter inclusive.

\* **2.6.1.(2)** Pipe and fittings conforming to Clauses (a) and (b) may be interconnected for sizes 2" diameter to 10" diameter only.

**2.6.2.** Cast-iron fittings designed for use with asbestos-cement pipe for drainage purposes shall conform to the applicable requirements of CSA B70, "Cast Iron Soil Pipe, Fittings, and Means of Joining".

**2.6.3.(1)** Threaded cast-iron drainage fittings shall conform to ANSI B16.12 "Cast Iron Threaded Drainage Fittings."

(2) Threaded cast-iron drainage fittings shall not be used in a *water system*.

Cast-iron soil  
pipe and  
fittings

Threaded cast-  
iron drainage  
fittings

Cast-iron  
water pipe

**2.6.4.(1)** Cast iron water pipes shall conform to

- (a) ANSI/AWWA C106/A21.6, "Gray-Iron Pipe Centrifugally Cast in Metal Molds, for Water or Other Liquids," or
- (b) ANSI/AWWA C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids."

(2) Cement mortar lining for cast-iron water pipes shall conform to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water."

(3) Cast-iron fittings for cast-iron or ductile-iron water pipes shall conform to ANSI/AWWA C110/A21.10, Gray-Iron and Ductile-Iron Fittings, 3-in. Through 48-in. for Water and Other Liquids."

(4) Rubber gasket joints for cast-iron and ductile-iron pressure pipe for water piping shall conform to ANSI/AWWA C111/A21.11, "Rubber-Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings."

Cast-iron  
screwed water  
fittings

**2.6.5.(1)** Screwed cast-iron water fittings shall conform to ANSI B16.4, "Cast Iron Threaded Fittings, 125 and 250 lb."

(2) Screwed cast-iron water fittings used in a *water system* shall be cement mortar lined or galvanized.

(3) Screwed cast-iron water fittings shall not be used in a *drainage system*.

Malleable iron  
screwed water  
fittings

**2.6.6.(1)** Screwed malleable iron water fittings shall conform to ANSI B16.3, "Malleable Iron Threaded Fittings 150 and 300 lb."

(2) Screwed malleable iron water fittings used in a *water system* shall be cement mortar lined or galvanized.

(3) Screwed malleable iron water fittings shall not be used in a *drainage system*.

Steel pipe

**2.6.7.(1)** Except as provided in Sentences (2) and (3), welded and seamless steel pipe shall not be used in a *plumbing system*.

(2) Galvanized steel pipe may be used in a *drainage system* or a *venting system* above ground inside a *building*.

(3) Galvanized steel piping shall not be used in a *water distribution system*, except

- (a) in *buildings* of industrial occupancy as described in the British Columbia Building Code, 1985 or
- (b) for the repair of existing galvanized steel piping systems, or
- (c) unless *accepted*.

(4) Galvanized steel pipe shall conform to ASTM A53, "Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless."

Corrugated  
steel  
pipe

**2.6.8.(1)** Corrugated steel pipe and couplings shall conform to CAN3-G401, "Corrugated Steel Pipe Products."

(2) Corrugated steel pipe shall only be used underground outside a *building* in a *storm drainage system*.

(3) Couplings for corrugated steel pipe shall be constructed so that when installed they shall:

- (a) maintain the pipe alignment,
- (b) resist the separation of adjoining lengths of pipe,
- (c) prevent root penetration, and
- (d) prevent the infiltration of surrounding material.

2.6.9. A sheet metal *leader* shall not be used except above ground outside a *building*.

Sheet metal  
leader

## SUBSECTION 2.7 NON-FERROUS PIPE AND FITTINGS

(For summary of pipe applications see Appendix.)

2.7.1.(1) Copper pipe shall conform to ASTM B42, "Seamless Copper Pipe, Standard Sizes."

Copper and  
brass pipe

(2) Brass pipe shall conform to ASTM B43, "Seamless Red Brass Pipe, Standard Sizes."

2.7.2. Brass or bronze pipe flanges and flanged fittings shall conform to ANSI B16.24, "Bronze Pipe Flanges and Flange Fittings, 150 and 300 lb."

Brass or bronze  
flanges and  
flanged fitting

2.7.3.(1) Brass or bronze threaded water fittings shall conform to ANSI B16.15, "Cast Bronze Threaded Fittings, Class 125 and 250."

Brass or bronze  
threaded water  
fittings

(2) Brass or bronze threaded water fittings shall not be used in a *drainage system*.

2.7.4.(1) Copper tube shall conform to:

Copper tube

(a) ASTM B88, "Seamless Copper Water Tube," or

(b) ASTM B306, "Copper Drainage Tube (DWV)."

(2) Except as provided in Sentence (3), the use of copper tube shall conform to Table 2.7.A.

2.7.4.(3) Copper tube shall not be used for the *fixture drain* or the portion of the *vent* below the *flood level rim* of a flush valve-operated urinal.

**Table 2.7.A.**  
Forming part of Article 2.7.4.

| Type of<br>Copper<br>Tube or<br>Pipe | PLUMBING PURPOSES        |                                 |                  |                   |                    |                  |                   |                  |
|--------------------------------------|--------------------------|---------------------------------|------------------|-------------------|--------------------|------------------|-------------------|------------------|
|                                      | Water<br>Service<br>Pipe | Water<br>Distribution<br>System |                  | Building<br>Sewer | Drainage<br>System |                  | Venting<br>System |                  |
|                                      |                          | Under-<br>ground                | Above-<br>ground |                   | Under-<br>ground   | Above-<br>ground | Under-<br>ground  | Above-<br>ground |
| K & L Hard                           | N                        | N                               | P                | P                 | P                  | P                | P                 | P                |
| K & L Soft                           | P                        | P                               | P                | N                 | N                  | N                | N                 | N                |
| M Hard                               | N                        | N                               | N                | N                 | N                  | P                | N                 | P <sup>a</sup>   |
| M Soft                               | N                        | N                               | N                | N                 | N                  | N                | N                 | N                |
| DWV                                  | N                        | N                               | N                | N                 | N                  | P                | N                 | P                |
| Column 1                             | 2                        | 3                               | 4                | 5                 | 6                  | 7                | 8                 | 9                |

P — Permitted    N — Not Permitted

Solder-joint  
drainage fittings

**2.7.5.(1)** Solder-joint fittings for *drainage systems* shall conform to:

- (a) CSA B158.1, "Cast Brass Solder-joint Drainage, Waste and Vent Fittings," or
- (b) ANSI B16.29, "Wrought Copper and Wrought Copper Alloy Solder-joint Drainage Fittings — DWV."

(2) Solder-joint fittings for *drainage systems* shall not be used in a *water system*.

**2.7.6.(1)** Except as provided in Sentence (2), solder-joint fittings for *water systems* shall conform to:

- (a) ANSI B16.18, "Cast Copper Alloy Solder-Joint Pressure Fittings," or
- (b) ANSI B16.22, "Wrought Copper and Bronze Solder-Joint Pressure Fittings."

(2) Solder joint fittings for *water systems* not made by casting or the wrought process shall conform to the applicable requirements of ANSI B16.18, "Cast Bronze Solder-Joint Pressure Fittings."

Flared-joint  
water fittings

**2.7.7.(1)** Flared-joint fittings for copper tube *water systems* shall conform to ANSI B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes."

(2) Flared-joint fittings for copper tube *water systems* not made by casting shall conform to the applicable requirement of ANSI B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes."

Lead waste  
pipe and bends

**2.7.8.(1)** Lead waste pipe and fittings shall conform to CSA B67, "Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories."

- \* (2) When there is a change in size of a closet bend the change shall be in the vertical section of the bend or made in such a manner that there shall be no retention of liquid in the bend.

(3) Lead waste pipe and fittings shall not be used in a *water system* or for a *building sewer*.

- \* **2.7.9.(1)** Drainage piping and vent piping made of aluminum and its components shall conform to CAN3-B281 "Aluminum Drain, Waste and Vent Pipe, and Components."

- \* (2) Aluminum DWV pipe shall not be used in *water systems*.

- \* (2) Aluminum drain waste and vent pipe to be buried underground shall be protected by a factory applied coating in accordance with CAN3-B281.

## SUBSECTION 2.8 JOINTING MATERIALS

Cement jointing  
mortar

**2.8.1.** Cement mortar for jointing shall be a mixture of equal parts of clean, sharp mortar sand and portland cement.

**2.8.2.** Cold caulking compounds shall conform to CGSB 77-GP-1M, "Caulking Compound: Cementitious Type, Cold Applied, for Pipe Joints."

Solder and  
caulking lead

**2.8.3.(1)** Wiping solder and caulking lead shall conform to CSA B67, "Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories."

- \* (2) Solders for solder joint fittings shall conform to ASTM B32, "Solder Metal" in accordance with the recommended use. (See Appendix)

- \* (3) For all copper tube installed underground outside the *building* or underground inside the *building*, the joints shall be flared, or the joints shall be brazed using brazing alloy from the American Welding Society AWS-BCuP range.

## SUBSECTION 2.9 MISCELLANEOUS MATERIALS

**2.9.1.** Brass floor flanges shall conform to CSA B158.1, "Cast Brass Solder Joint Drainage, Waste and Vent Fittings."

2.9.2.(1) Every screw, bolt, nut and washer shall be of brass when used:

- (a) to connect a water closet to a water closet flange.
- (b) to anchor the water closet flange to the floor, or
- (c) to anchor the water closet to the floor.

\* 2.9.3.(1) Every plug, cap, nut or bolt that is intended to be removable from a ferrous fitting shall be of an acceptable non-ferrous material.

Cleanout fittings

(2) A *cleanout* fitting that as a result of normal maintenance operations cannot withstand the physical stresses of removal and reinstallation or cannot ensure a gas-tight seal shall not be installed.

2.9.4.(1) Groove and shoulder type mechanical pipe couplings shall conform to CSA B242, "Groove and Shoulder Type Mechanical Pipe Couplings."

(2) Groove and shoulder type mechanical pipe couplings shall be provided with an elastomeric seal and shall be housed with a metal clamp which shall interlock with a groove or shoulder on the pipe ends.

\* 2.9.5.(1) A saddle hub shall not be installed in a *drainage system* or *venting system*.

Saddle hub

(2) A saddle hub shall not be installed in a *water system* unless *accepted*.

\* 2.9.6. Supply and waste fittings shall conform to CSA B125, "Plumbing Fittings" unless *accepted*.

Supply and waste fittings

2.9.7.(1) Every direct flush valve shall:

- (a) open fully and close positively under service pressure,
- (b) complete its cycle of operation automatically,
- (c) be provided with a means of regulating the volume of water that it discharges, and
- (d) be provided with a *vacuum breaker* unless the fixture is designed so that *back-siphonage* cannot occur.

Direct flush valve

2.9.8.(1) The orifice of every drinking fountain bubbler shall:

- (a) be of the shielded type, and
- (b) direct the water upward at an angle of approximately 45 deg.

Drinking fountain bubblers

(2) Every drinking fountain bubbler shall include a means of regulating the flow to the orifice.

\* (3) Bubblers shall be installed only on drinking fountains except when otherwise *accepted*.

2.9.9.(1) Except as provided in Sentence (2), *back-siphonage preventers* and *backflow preventers* shall conform to:

- (a) CSA B64.0, "Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers."
- (b) CSA B64.1.1, "Vacuum Breakers — Atmospheric Type,"
- (c) CSA B64.1.2, "Vacuum Breakers — Pressure Type,"
- (d) CSA B64.2, "Vacuum Breakers — Hose-Connection Type,"
- (e) CSA B64.3, "Backflow Preventers — Superior-Pressure-Principle Type,"
- (f) CSA B64.4, "Backflow Preventers — Reduced-Pressure-Principle Type," or
- (g) CSA B64.5, "Backflow Preventers — Double-Check-Valve Type."

(2) *back-siphonage preventer* for tank type water closets shall conform to CSA B125, "Plumbing Fittings."

2.9.10. Temperature relief, pressure relief, combined temperature and pressure relief and vacuum relief valves shall conform to CAN1-4.4, "Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves."

## SECTION 3 PIPING

### SUBSECTION 3.1 APPLICATION

3.1.1. This Section applies to the construction and use of joints and connections, and the arrangement, protection, support and testing of piping.

### SUBSECTION 3.2 CONSTRUCTION AND USE OF JOINTS

Caulked lead  
drainage joints

3.2.1.(1) Every caulked lead drainage joint shall be firmly packed with oakum and tightly caulked with lead to a depth of at least 25 mm.

(2) No paint, varnish or other coating shall be applied on the lead until after the joint has been tested.

\* (3) Caulked lead drainage joints shall not be used except for cast-iron pipe in a *drainage system*, or between such pipe and

- (a) other ferrous pipe,
- (b) brass and copper pipe,
- (c) a caulking ferrule,
- (d) a *trap standard*, or
- (e) aluminum DWV pipe.

(4) A length of hub and spigot pipe and pipe fittings in a *drainage system* shall be installed with the hub at the upstream end.

3.2.2.(1) Wiped joints shall not be used except for sheet lead or lead pipe, or between such pipe and copper pipe or a ferrule.

(2) Every wiped joint in straight pipe shall

- (a) be made of solder,
- (b) have an exposed surface on each side of the joint at least 19 mm wide, and
- (c) be at least 10 mm thick at the thickest part.

(3) Every wiped flanged joint shall be reinforced with a lead flange that is at least 19 mm wide.

Screwed joints

3.2.3.(1) In making a screwed joint the ends of the pipe shall be reamed or filed out to the size of the bore and all chips and cuttings shall be removed.

(2) No pipe-joint cement or paint shall be applied to the internal threads.

\* (3) Aluminum DWV pipe shall not be used with a screwed joint.

Soldered joints

3.2.4.(1) In making a soldered joint the surface to be soldered shall be cleaned bright and the joint shall be properly fluxed, soldered and thoroughly cleaned of all residue.

\* (2) Aluminum DWV pipe shall not be used with soldered joints.

3.2.5.(1) In making a flared joint the pipe shall be expanded with a proper flaring tool. Flared Joints

(2) Flared joints shall not be used for hard (drawn) copper tube.

\* (3) Flared joints shall not be used for aluminum DWV pipe.

3.2.6.(1) Hot-poured joints shall be caulked tightly with twisted oakum and rammed, and a hot-poured caulking compound shall be placed to a depth of at least 25 mm all around the pipe. Hot-poured joints

(2) Hot-poured joints shall not be used except for vitrified clay or concrete pipe, or between either of such pipes and ferrous pipe.

3.2.7.(1) Cement joints in pipe that has a size of 6 in. or less shall be made by completely filling the annular space between the bell and the spigot with cement mortar. Cement joints

(2) Every cement joint in pipe that has a size of more than 6 in. shall be made by:

(a) ramming into the annular space between the bell and the spigot a gasket of closely twisted hemp or oakum at least equal in length to the circumference of the pipe, and

(b) filling the remaining annular space with mortar.

(3) The exterior of every cement joint shall be carefully shaped from the outside of the bell to the barrel of the pipe at an angle of approximately 45 deg.

(4) After every joint is made the interior of the pipe shall be thoroughly swabbed and cleaned.

(5) Cement joints shall not be used except for vitrified clay or concrete pipe or between either of such pipes and ferrous pipe.

3.2.8.(1) In making a burned lead joint the lead shall be lapped and fused to form a weld that is at least  $1\frac{1}{2}$  times as thick as the wall of the pipe. Burned lead joints

(2) In lead pipe the width of the weld shall be at least:

(a) 13 mm where the size of the pipe is less than 3 in.,

(b) 16 mm where the size of the pipe is 3 in., or

(c) 19 mm where the size of the pipe is 4 in.

(3) In sheet lead the width of the weld shall be as specified in Table 3.2.A.

Table 3.2.A.  
Forming Part of Sentence 3.2.8.(3)

| Weight of Sheet Lead<br>kg/m <sup>2</sup> | Minimum Width of<br>Weld, mm |
|-------------------------------------------|------------------------------|
| 12.2 to 14.6                              | 6                            |
| 19.5 to 24.4                              | 10                           |
| 29.3 to 39.1                              | 20                           |
| 48.8 to 58.6                              | 25                           |
| 58.6 to 146.5                             | 32                           |
| Column 1                                  | 2                            |

\* 3.2.9. Mechanical joints shall be made with acceptable compounded elastomeric couplings or rings held by stainless steel or cast-iron clamps or contained with a compression connection or groove and shoulder type mechanical coupling. Mechanical joints

3.2.10.(1) Cold-caulked joints shall not be used except for bell and spigot pipe in a water system or a drainage system. The caulking compound shall be applied according to the manufacturer's directions. Cold-caulked joints

(2) Every cold-caulked joint in a *drainage system* shall be firmly packed with oakum and tightly caulked with cold caulked compound to a depth of at least 25 mm.

(3) Every cold-caulked joint in a *water system* shall be made by tightly caulking the entire depth of the socket with caulking compound.

### SUBSECTION 3.3 JOINTS AND CONNECTIONS

Drilled and  
tapped joints

3.3.1. Drilled and tapped joints shall not be made in *soil-or-waste pipe* and *vent pipe* and fittings unless suitable provision has been made for drilling and tapping.

Welded joints

3.3.2.(1) Cast-iron soil pipe and fittings shall not be welded.

(2) Galvanized steel pipe and fittings shall not be welded.

\* (3) Aluminum DWV pipe shall not be welded.

Unions and  
slip joints

3.3.3.(1) Running thread and packing nut connections and unions with a gasket seal shall not be used downstream of a *trap weir* in a *drainage system* or in a *venting system*.

(2) A slip joint shall not be used:

(a) in a *venting system*, or

(b) In a *drainage system*, except when in an *accessible* location and except to connect a *fixture trap* to a *fixture drain* or a *trap* to a *fixture outlet pipe*. (See Appendix explaining Sentence 2.3.1.(1) and (2).)

Increaser or  
reducer

3.3.4. Every connection between drainage pipes of different sizes shall be made with a tapered increaser or a tapered reducer fitting installed so that it will permit the system to be completely drained.

Burned lead

3.3.5. Every joint in hard lead shall be made with a burned lead joint.

Dissimilar  
connections

3.3.6.(1) Adaptors, connectors or mechanical joints used to join dissimilar material shall be designed to accommodate the required transition.

\* (2) Other methods of joining dissimilar materials shall not be used unless *accepted*.

Connection of  
roof drain to  
leader

3.3.7. Every *roof drain* shall be securely connected to a *leader* and provision shall be made for expansion and contraction.

Connection of  
floor outlet  
fixtures

3.3.8.(1) Every pedestal urinal, floor-mounted water closet or *S-trap standard* shall be connected to a *fixture drain* by a floor flange, except that a cast-iron *trap standard* may be caulked to a cast-iron pipe.

(2) Except as provided in Sentence (3), every floor flange shall be brass.

(3) Where plastic pipe is used, a floor flange of the same material shall be used.

(4) Every floor flange shall be securely fastened to a firm base and bolted to the *trap flange of the fixture*, and every joint shall be sealed with a natural rubber, synthetic rubber or asbestos graphite gasket, or with a closet setting compound.

(5) Where a lead water closet stub is used, the length of the stub below the floor flange shall be at least 75 mm.

3.3.9. The design and installation of every piping system shall, where necessary, include means to accommodate expansion and contraction of the piping system caused by temperature change or movement of the soil. (See Appendix.)

\* 3.3.10.(1) Types M, DWV and hard drawn copper tube shall not be bent.

\* (2) Aluminum DWV pipe shall not be bent.

Making  
indirect  
connections

3.3.11.(1) Where a *fixture* or device is *indirectly connected*, the connection shall be made by terminating the *fixture drain* above the *flood level rim* of a *directly connected fixture* to form an *air break*.

- \* (2) The unobstructed distance of *air break* shall at least equal the *size of the fixture drain, branch* or pipe that terminates above the *directly connected fixture*, and it shall be at least 25 mm. (See Appendix.)

### SUBSECTION 3.4 SUPPORT OF PIPING

3.4.1.(1) Piping shall be provided with support that is capable of keeping the pipe in alignment and bearing the weight of the pipe and its contents.

Capability of support

(2) Every floor or wall-mounted water-closet bowl shall be securely attached to the floor or wall by means of a flange and shall be stable.

(3) Every wall-mounted *fixture* shall be supported so that no strain is transmitted to the piping.

3.4.2. Piping, *fixtures*, tanks or devices shall be supported independently of each other.

Independence of support

3.4.3.(1) Where a hanger or support for copper tube or brass or copper pipe is of a material other than brass or copper, it shall be suitably separated and electrically insulated from the pipe.

Insulation of support

- \* (2) Where a hanger or support for aluminum DWV pipe is of a metal other than aluminum, the hanger or support should be suitably separated and electrically insulated from the pipe.

3.4.4.(1) Except as provided in Sentences (2), vertical piping shall be supported at its base and at the floor level of alternate *storeys* by metal rests, each of which can bear the weight of pipe that is between it and the metal rest above it.

Support for vertical piping

(2) The maximum spacing of supports shall be 7.5 m.

3.4.5.(1) *Nominally horizontal* piping that is inside a *building* shall be braced to prevent swaying and buckling and to control the effects of thrust.

Support for horizontal piping

(2) *Nominally horizontal* piping shall be supported so that:

- (a) galvanized iron or steel pipe is supported at intervals not exceeding:
  - (i) 3.75 m if the pipe *size* is 6 in. or more, and
  - (ii) 2.5 m if the pipe *size* is less than 6 in.,
- (b) lead pipe is supported throughout its length,
- (c) cast-iron pipe is supported
  - (i) at or adjacent to each hub or joint,
  - (ii) at intervals not exceeding 1.6 m, and
  - (iii) at intervals not exceeding 1 m if the pipe has mechanical joints and the length of pipe between adjacent fittings is 300 mm or less,
- (d) asbestos-cement pipe is supported
  - (i) at intervals not exceeding 2 m, or have 2 supports for every 4 m length of pipe, and
  - (ii) at intervals not exceeding 1 m where the length of pipe between adjacent fittings is 300 mm or less,
- (e) ABS or PVC plastic pipe is supported
  - (i) at intervals not exceeding 1.2 m,
  - (ii) at the ends of *branches*,
  - (iii) at changes of direction or elevation, and
  - (iv) if the pipe is a *fixture drain* that is more than 1 m in length, as close as possible to the *trap*,
- (f) CPVC or polybutylene plastic pipe is supported at intervals not exceeding 1 m,
- (g) Copper tube and copper and brass pipe is supported at intervals not exceeding:
  - (i) 3 m if the tube or pipe is hard temper and larger than 1 in. in *size*,

- (ii) 2.5 m if the tube or pipe is hard temper and 1 in. in size or less, and
  - (iii) 2.5 m if the tube is soft temper.
- (h) Aluminum DWV pipe is supported
    - (i) at or adjacent to each joint,
    - (ii) at intervals not exceeding 2 m,
    - (iii) at upstream ends of branches, *building drains* and *fixture drains*, and
    - (iv) at changes of direction or elevation, and
- (i) Supports and hangers for aluminum DWV pipe shall have a broad support base and shall be free of burrs and rough edges to prevent abrasion of the pipe.
- (3) Where PVC, CPVC or ABS plastic pipe is installed:
  - (a) the pipe shall be aligned without added strain on the piping,
  - (b) the pipe shall not be bent or pulled into position after being welded, and
  - (c) hangers shall not compress, cut or abrade the pipe.
- (4) The supports for *nominally horizontal* piping shall be:
    - (a) hangers with metal rods of not less than:
      - (i) 6 mm diameter supporting up to 2" pipe size,
      - (ii) 8 mm diameter supporting up to 4" pipe size,
      - (iii) 13 mm diameter supporting over 4" pipe size.
    - (b) solid or perforated metal straps:
      - (i) not less than 0.6 mm nominal thick and, 12 mm wide for pipe 2 inches or less in size, and
      - (ii) not less than 0.8 mm thick, 18 mm wide for pipe 4 inches and less in size and more than 2 inches in size.
- (5) Where a hanger is attached to concrete or masonry, it shall be fastened by metal or expansion-type plugs that are inserted or built into the concrete or masonry.

3.4.6.(1) Except as provided in Sentence (2), *nominally horizontal* piping that is underground shall be supported on a base that is firm and continuous under the whole of the pipe. (See Appendix A.)

3.4.6.(2) *Nominally horizontal piping* installed underground that is not supported as described in Sentence (1) may be installed using hangers fixed to a foundation or structural slab provided that the hangers are capable of keeping the pipe in alignment and supporting the weight of the pipe, its contents and the fill over the pipe.

- \* 3.4.7. Where a *vent pipe* terminates more than 1.5 m above the surface of a roof it shall be supported or braced to prevent misalignment. (See Article 5.6.5 for location of *vent pipe* terminals.)

### SUBSECTION 3.5 PROTECTION OF PIPING

3.5.1. Where piping is installed underground, the backfill shall be carefully placed and tamped to a height of 300 mm over the top of the pipe and shall be free of stones, boulders, cinders and frozen earth. (See Appendix.)

3.5.2. Where asbestos-cement drainage pipe or vitrified clay pipe is located less than 600 mm below a basement floor and the floor is constructed of other than 75 mm or more of concrete, the pipe shall be protected by a 75 mm layer of concrete installed above the pipe. (See Appendix.)

3.5.3. Where piping passes through or under a wall it shall be installed so that the wall does not bear on the pipe.

\* 3.5.4. Piping in exterior *building* walls or unheated spaces shall be adequately protected against freezing by insulation or heat or both.

Protection of  
non-metallic  
pipes

Isolation from  
loads

Protection from  
frost

3.5.5. Plumbing, piping and equipment exposed to mechanical damage shall be protected.

\* 3.5.6. Copper tubing passing through concrete shall be protected from corrosion and mechanical damage by being sleeved by an *accepted* means.

\* 3.5.7. *Building sewers* and *water service piping* not installed below the ground freezing level shall be installed in a manner *acceptable* to the *authority having jurisdiction*.

### SUBSECTION 3.6 TESTING OF DRAINAGE AND VENTING SYSTEMS

\* 3.6.1.(1) Except in the case of an external *leader*, after a section of a *drainage system* or a *venting system* has been roughed in and before any *fixture* is installed or piping is covered, a water or air test shall be conducted to the satisfaction of the *authority having jurisdiction*.

\* (2) When requested by the *authority having jurisdiction*, a ball test shall be made to any pipe in a *drainage system*.

(See Subsection 1.9 for additional requirements for inspection and testing.)

\* 3.6.2.(1) Every *drainage system* except an external *leader* or *fixture outlet pipe* shall be capable of withstanding without leakage, a water test, air test or smoke test.

(2) Every pipe in a *drainage system* shall be capable of meeting a ball test.

\* 3.6.3. Every *venting system* shall be capable of withstanding without leakage a water test, air test or smoke test.

Tests of venting system

3.6.4.(1) Where a water test is made it shall be applied to:

Water test

(a) the system as a whole, or

(b) sections of the system, each of which is at least 3 m high and includes at least 1.5 m of the section below.

(2) In making a water test:

(a) every opening, except the highest shall be tightly closed with a testing plug or a screw cap, and

(b) the system or the section shall be kept filled with water for 15 min.

3.6.5.(1) Where an air test is made:

Air test

(a) every opening in the system shall be closed,

(b) air shall be forced into the system until a pressure of 35 kPa is created, and

(c) this pressure shall be maintained for 15 min. without the addition of more air.

\* 3.6.6.(1) Where a smoke test is made:

Smoke test

(a) every *trap* shall be filled with water,

(b) the bottom of the system being tested shall terminate at a *building trap*, test plug or cap,

(c) except as provided in Sentence (2), smoke shall be forced into the system,

(d) when the smoke appears from all roof terminals they shall be closed, and

(e) a pressure equivalent to a 25 mm water column shall be maintained for 15 min. without the addition of more smoke.

\* (2) When *acceptable* the smoke referred to in Clauses 3.6.6.(1)(c) and (d) may be omitted, the roof terminals closed and an air pressure equivalent to a 25 mm water column shall be maintained for 15 min. without the addition of more air.

3.6.7.(1) Where a ball test is made, a hard ball dense enough not to float shall be rolled through the pipe.

Ball test

- (2) The diameter of the ball shall not be less than:
  - (a) 50 mm where the size of the pipe is 3 in. or more, or
  - (b) 25 mm where the size of the pipe is less than 3 in.

### SUBSECTION 3.7 TESTING OF POTABLE WATER SYSTEMS

(See Subsection 1.9 for additional requirements for inspection and testing.)

Application of  
tests

- \* 3.7.1.(1) After a section of a *potable water system* has been completed and before it is placed in operation, a water test shall be conducted to the satisfaction of the *authority having jurisdiction*, except that an air test may be used in freezing conditions.

- (2) A test may be applied to each section of the system or to the system as a whole.

- \* (3) Where a prefabricated system is installed as part of a *water system* and has been *accepted*, all other plumbing work shall be tested and inspected and the complete system shall be pressure tested when requested by the *authority having jurisdiction*.

Tests of water  
systems

- \* 3.7.2.(1) Except as required by Sentence (2), every *potable water system* shall be capable of:

- (a) withstanding without leakage a water pressure that is at least equal to the maximum pressure to which it may be subject in service, or

- (b) withstanding for at least 2 hr without a drop in pressure an air pressure that is at least 700 kPa.

- (2) When the system serves a *building* of other than one or two family units, the system shall withstand for at least 2 hrs without a drop in pressure a water test of at least 1400 kPa.

Water tests

3.7.3.(1) Where a water test is made all air shall be expelled from the system before *fixture* control valves or faucets are closed.

- (2) *Potable water* shall be used to test a *potable water system*.

## SECTION 4 DRAINAGE SYSTEMS

### SUBSECTION 4.1 APPLICATION

**4.1.1.** This Section applies to a *sanitary drainage system*, a *storm drainage system*, a *combined building drain* or a *combined building sewer*.

### SUBSECTION 4.2 CONNECTIONS TO DRAINAGE SYSTEMS

**4.2.1.(1)** Every fixture shall be *directly connected* to a *sanitary drainage system*, except that:

- (a) drinking fountains may be
  - (i) *indirectly connected* to a *sanitary drainage system*, or
  - (ii) connected to a *storm drainage system* provided that where the system is subject to *backflow*, a *check valve* is installed in the fountain waste pipe. (see Appendix).

Connection to  
sanitary  
drainage  
system

- (b) where *acceptable*, a floor drain may be connected to a *storm drainage system* provided it is located where it can receive only *clear-water waste* or *storm water*.

- (c) fixtures or appliances that discharge only *clear-water waste* may be connected to a *storm drainage system* or be drained onto a roof or other *acceptable area*.

- (d) the following devices shall be *indirectly connected* to a *drainage system*:
  - (i) a device for the display, storage, preparation or processing of food or drink,
  - (ii) a sterilizer
  - (iii) a device that uses water as a cooling or heating medium,
  - (iv) a water operated device,
  - (v) a water treatment device, or
  - (vi) a drain or overflow from a *water system* or a heating system (see Appendix).

Indirectly  
connected  
fixtures

- (e) fixtures that have a hydraulic load of not more than  $1\frac{1}{2}$  fixture units may be connected to a vertical section of a *circuit vent* provided:
  - (i) the fixtures are located in the same storey as the fixtures served by the vent pipe,
  - (ii) not more than 2 fixtures are connected to the vent pipe,
  - (iii) where 2 fixtures are connected to the vent pipe, the connection is by means of a double sanitary T fitting, and
  - (iv) the section of the vent pipe that becomes a *wet vent* conforms to the requirements for *wet vents*. (see Appendix).

Connections to  
a circuit vent

- (f) fixtures that have a hydraulic load of not more than  $1\frac{1}{2}$  fixture units may be connected to the vertical section of a *yoke vent* provided:
  - (i) not more than 2 fixtures are connected to the vent pipe,
  - (ii) where 2 fixtures are connected to the vent pipe, the connection is by means of a double sanitary T fitting, and
  - (iii) the section of the vent pipe that becomes a *wet vent* conforms to the requirements for *wet vents*. (see Appendix).

Connection to  
yoke vents

- (g) fixtures may be connected to a *vent stack* provided:
  - (i) the total hydraulic load of the connected fixtures does not exceed six fixture units,
  - (ii) at least 1 fixture is connected to a vertical portion of the vent stack and upstream of any other fixtures,
  - (iii) all fixtures are located in the lowest storey served by the vent stack, and
  - (iv) the section of the vent pipe that becomes a *wet vent* conforms to the requirements for *wet vents*. (See Appendix).

Connections to  
a vent stack

- (h) floor drains located in food preparation areas shall be protected from backflow from sanitary drains and sewers by a suitable arrangement of sumps or backwater valves, and:
  - (i) food waste disposal units, water closets, or urinals shall not discharge into the sump in Subclause 4.2.1.(1)(h).

Connection to  
a sanitary drainage  
system in  
food preparation  
areas

- (ii) the section of a *drainage system* that serves floor drains located in an area for the display, storage, preparation or processing of food or drink, shall be vented at upper and lower ends of the section with minimum 1½" vents, (See Appendix).
- Island fixture \* (i) island fixtures shall be connected to a vent, and the *developed length* for the *fixture outlet pipe* shall not exceed 1 200 mm. (See Appendix).
- Connections to an offset \* (2) The connections of a *soil-or-waste pipe* to a *nominally horizontal offset* in a *soil-or-waste stack* shall be at least 1.5m measured horizontally from the bottom of the upper vertical section of the *soil-or-waste stack* where such upper vertical section:
- (a) receives a discharge of 30 or more *fixture units*, and
  - (b) receives a discharge from *fixtures* located on 2 or more *storeys*. (See Appendix).
- \* (3) The connection of a *soil-or-waste pipe* to a *nominally horizontal soil-or-waste pipe* shall be at least 1.5 m measured horizontally from the bottom of a *soil-or-waste-stack* that:
- (a) receives a discharge of 30 or more *fixture units*, and
  - (b) receives a discharge from *fixtures* located on 2 or more *storeys*. (See Appendix).
- (4) No other *fixture* shall be connected to a lead bend or stub that serves a water closet.
- Storm drainage \* (5) All roof and paved areas, except those related to a one or two family dwelling, shall drain to a *storm drainage system*.
- 4.2.2. An overflow from a rainwater tank shall not be *directly connected* to a *drainage system*.
- 4.2.3.(1) Two or more *fixture outlet pipes* that serve outlets from a single *fixture* that is listed in Clause 4.2.1.(1)(d) may be *directly connected* to a *branch* that:
- (a) has a size of at least 1¼ in., and
  - (b) is terminated above the *flood level rim* of a *directly connected fixture* to form an *air break*.
- (2) *Fixture drains* from *fixtures* that are listed in Subclauses (i) and (ii) of Clause 4.2.1.(1)(d) may be *directly connected* to a *pipe* that:
- (a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *sanitary drainage system*, and
  - (b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it. (See Appendix explaining Clauses 4.2.1.(1)(a) and (d)).
- (3) *Fixture drains* from *fixtures* that are listed in Subclauses (iii) to (vi) of Clause 4.2.1.(1)(d) may be *directly connected* to a *pipe* that:
- (a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *storm drainage system*, and
  - (b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.

#### SUBSECTION 4.3 LOCATION OF FIXTURES

- \* 4.3.1.(1) Every urinal shall be installed so that water from the urinal cannot run onto the walls or floor beneath the *fixture*.
- \* (2) The floor and walls adjacent to a urinal shall be protected by glazed tile or other *acceptable material*:
- (a) to within 300 mm of an part of the urinal extended to the floor,
  - (b) from the floor to 300 mm above the urinal, and

(c) to 300 mm in front of any part of the urinal.

\* (3) The *authority having jurisdiction* may permit the installation of on-site constructed trough urinals.

\* (4) Where automatic flushing devices are to be used for urinals, a floor drain shall be installed.

4.3.2. Indirect connections or any *trap* that may overflow shall not be located in a crawl space or any other unfrequented area.

Restricted  
locations

4.3.3. Garbage grinders, potato peelers and other similar types of equipment shall not be located upstream of an *interceptor*.

Garbage  
grinders

4.3.4. A floor drain or other *fixture* located in an oil transformer vault, a high voltage room or any room where flammable, dangerous or toxic chemicals are stored or handled shall not be connected to a *drainage system*.

#### SUBSECTION 4.4 TREATMENT OF SEWAGE AND WASTES

\* 4.4.1. Where a *fixture* or equipment discharges *sewage* or waste that in the opinion of the *authority having jurisdiction* may damage or impair the *sanitary drainage system* or the functioning of a public or private *sewage disposal system*, provision shall be made for treatment of the *sewage* or waste before it is discharged to the *sanitary drainage system*.

Sewage treatment

\* 4.4.2. Where a *fixture* discharges *sewage* or *clear-water waste* that has been heated, the *drainage system* shall be suitable for the temperature of the *sewage* or *clear-water waste* being discharged.

Cooling of hot  
wastes or  
sewage

\* 4.4.3.(1) Except for a *fixture* having a rinse cycle temperature of not less than 80° C a *fixture* that discharges *sewage* that includes grease that is located in a public kitchen or restaurant or in an institution, shall have a grease *interceptor* installed when and where required by the *authority having jurisdiction*.

Grease  
interceptors

(2) Where the discharge from a *fixture* may contain oil or gasoline, an oil *interceptor* shall be installed.

Oil or gasoline  
interceptors

(3) Where a *fixture* discharges sand, grit or similar materials, an appropriate *interceptor* shall be installed.

Grit  
interceptors

(4) Every *interceptor* shall have sufficient capacity to perform the service for which it is provided.

Capacity of  
interceptors

(See Article 5.5.2. for venting requirements for oil interceptors.)

#### SUBSECTION 4.5 TRAPS

4.5.1.(1) Except as provided in Sentences (2), (3), (4) and (5) in Article 4.5.2., every *fixture* shall be protected by a separate *trap*.

Traps

(2) One *trap* may protect:

(a) all the trays or compartments of a 2 or 3 compartment sink,

(b) a 2 compartment laundry tray, or

(c) 2 similar type single compartment *fixtures* located in the same room. (See Appendix.)

(3) One *trap* may serve a group of floor drains or shower drains, a group of washing machines or a group of laboratory sinks if the *fixtures*:

(a) are in the same room,

(b) are not located where they can receive food or other organic matter, and



- (c) food-handling or processing equipment.

4.6.3.(1) Piping that is too low to drain into a *building sewer* by gravity shall be drained to a sump or receiving tank.

Sumps or tanks

(2) Where the sump or tank receives *sewage* it shall be water and air-tight and shall be ventilated.

(3) Equipment such as a pump or ejector that can lift the contents of the sump or tank and discharge it into the *building drain* or *building sewer* shall be installed.

(4) Where the equipment does not operate automatically the *size* of the sump shall be sufficient to hold at least a 24 hr accumulation of liquid.

(5) Where there is a *building trap* the discharge pipe from the equipment shall be connected to the *building drain* downstream of the trap.

(6) The discharge pipe from every *sewage* sump shall be equipped with a union, a check valve and a shut-off valve installed in that sequence in the direction of discharge. (See Appendix.)

(7) The discharge piping from a pump or ejector shall be sized for optimum flow velocities at pump design conditions. (See Appendix A.)

\* 4.6.4.(1) A backwater valve or a gate valve shall not be installed in a *building drain* or in a *building sewer* unless the installation is acceptable.

Protection from backflow

(2) Except as provided in Sentences (3), (4) and (5), where a *building drain* or a *branch* may be subject to *backflow*, a gate valve or a backwater valve shall be installed on every *fixture drain* connected to them when the *fixture* is located below the level of the adjoining street.

(3) Where the *fixture* is a floor drain, a removable screw cap may be installed on the upstream side of the trap.

(4) Where more than 1 *fixture* is located on a storey and all are connected to the same *branch*, the gate valve or backwater valve may be installed on the *branch*.

(5) A *subsoil drainage pipe* that drains into a *sanitary drainage system* that is subject to surcharge shall be connected in such a manner that *sewage* cannot back up into the *subsoil drainage pipe*. (See Appendix A.)

#### SUBSECTION 4.7 CLEANOUTS

4.7.1.(1) Every *sanitary drainage system* and *storm drainage system* shall be provided with *cleanouts* that will permit the cleaning of the entire system.

Cleanouts for sanitary and storm drainage systems

(2) A *cleanout* fitting shall be provided on the upstream side and directly over every running trap.

(3) Every interior *leader* shall be provided with a *cleanout* fitting at the bottom of the *leader* or not more than 3 m upstream from the bottom of the *leader*.

(4) Where a *cleanout* is required on a *building sewer* 8 inches or larger in *size*, it shall be a manhole.

(5) Every *building drain* shall be provided with a *cleanout* fitting that is located as close as practical to the place where the *building drain* leaves the *building*.

(6) Every *soil-or-waste stack* shall be provided with a *cleanout* fitting:

- (a) at the bottom of the stack,
- (b) not more than 3 m upstream of the bottom of the stack, or
- (c) on a Y-fitting connecting the stack to the *building drain* or *branch*.

(7) A *cleanout* shall be provided to permit the cleaning of the piping downstream of an *interceptor*.

- (8) Cleanouts shall be installed so that the cumulative change in direction is not more than 90° between cleanouts in a drip pipe from a food receptacle or display case.

- (9) Where a branch, building drain or fixture drain serves a kitchen sink, a cleanout shall be installed as close as practical upstream of any cumulative horizontal change of direction of more than 45 degrees.

4.7.2.(1) Except as provided in Sentences (2) and (3), the size and spacing of cleanouts in nominally horizontal pipes of a drainage system shall conform to Table 4.7.A.

- (2) The spacing between manholes serving a building sewer:

- (a) 24 inches or less in size shall not exceed 90 m, and
- (b) over 24 inches in size shall not exceed 150 m.

- (3) The developed length of a building sewer between the building and the first manhole to which the building sewer connects shall not exceed 75 m.

- (4) Cleanouts capable of rodding one direction only shall be installed to rod in the direction of flow.

**\*Table 4.7.A.**  
Forming part of Sentence 4.7.2.(1)

| Size of<br>Drainage<br>Pipe, in. | Minimum<br>Size of<br>Cleanout, in. | Maximum Spacing, m |                    |
|----------------------------------|-------------------------------------|--------------------|--------------------|
|                                  |                                     | One Way<br>Rodding | Two Way<br>Rodding |
| 2½ or less                       | Same size as<br>drainage pipe       | 7.5                | 15                 |
| 3 & 4                            | 3                                   | 15                 | 30                 |
| 4                                | 4                                   | 26                 | 52                 |
| over 4                           | 4                                   | 35                 | 70                 |
| Column 1                         | 2                                   | 3                  | 4                  |

#### Manholes

- 4.7.3.(1) A manhole, sump or catch basin including the cover shall be designed to support all loads imposed upon it.

- (2) A manhole shall be provided with

- (a) a cover, which shall provide an airtight seal if located within a building,
- (b) a rigid ladder of a corrosion-resistant material to permit access to the bottom of the manhole, where the depth exceeds 1.5 m, and
- (c) a vent to the exterior if the manhole is located within a building.

- (3) A manhole shall be at least 1 m in diameter, except that the top 1.5 m may be eccentrically tapered to a minimum of 600 mm diameter.

- (4) A manhole in a sanitary drainage system shall be channelled to direct the flow of effluent.

#### Location of Cleanouts

- 4.7.4.(1) Cleanouts and access covers shall be located so that the openings are readily accessible for rodding and cleaning purposes.

- (2) A cleanout shall not be located in a floor assembly in a manner that may constitute a hazard and shall not be used as a floor drain.

- (3) There shall be no change of direction between a cleanout fitting and the trap that it serves.

- (4) The piping between a cleanout fitting and the drainage piping or vent piping that it serves shall not change direction by more than 45° unless acceptable.

## SUBSECTION 4.8 MINIMUM SLOPE AND LENGTH OF DRAINAGE PIPES

4.8.1. Except as provided in Articles 4.10.8. and 4.10.9., every drainage pipe that has a size of 3 in. or less, and every fixture drain shall have a downward slope in the direction of flow of at least  $\frac{1}{4}$  in 50. (See Appendix A.)

Minimum slope

- 4.8.2. Except for fixture outlet pipes installed in conformance with Sentence 4.5.1.(3), and Clause 4.2.1.(1)(i) the developed length of every fixture outlet pipe shall not exceed 900 m. (See Appendix explaining Sentence 4.5.1.(2)).

Length of  
fixture outlet  
pipes

## SUBSECTION 4.9 SIZE OF DRAINAGE PIPES

- 4.9.1.(1) A pipe in a drainage system shall be of a size not less than the size of:

(a) a vent pipe that is connected to it, or

No reduction  
in size

(b) the largest pipe that drains into it.

4.9.2.(1) The size of every drainage pipe that serves a water closet shall be at least 3 in.

Serving water  
closets

- (2) The size of every branch, building drain, sewer, or offset downstream of the third water closet connection shall be at least 4".

(3) The size of every soil-or-waste stack that serves more than 6 water closets shall be at least 4 in.

- (4) Except for a single family dwelling, the minimum size of every building sewer and the underground portion of every building drain shall be 4 inches.

4.9.3.(1) Except as provided in Sentences (2) and (3), the size of every fixture outlet pipe shall conform to Table 4.9.A.

(2) The part of the fixture outlet pipe that is common to 3 compartments of a sink shall be 1 size larger than the largest fixture outlet pipe of the compartments that it serves. (See Appendix.)

- (3) The size of every fixture outlet pipe not listed in Table 4.9.A shall be acceptable.

- (4) The trap arm and trap shall not be more than one size larger than the fixture outlet pipe.

Table 4.9.A.  
Forming part of Sentences 4.9.3.(1)  
and 4.10.2.(1)

| Fixture                          | Min.<br>Size of<br>Fixture<br>Outlet<br>Pipe, &<br>trap, in. | Hydraulic Load,<br>fixture units |
|----------------------------------|--------------------------------------------------------------|----------------------------------|
| Autopsy table                    | 1½                                                           | 2                                |
| Bathroom group * * *             |                                                              |                                  |
| (a) with flush tank              |                                                              | 6                                |
| (b) with direct flush valve      |                                                              | 8                                |
| Bathtub (with or without shower) | 1½                                                           | 1½                               |
| Bath: foot, sitz or slab         | 1½                                                           | 1½                               |
| Boer cabinet                     | 1½                                                           | 1½                               |
| Bidet                            | 1¼                                                           | 1                                |
| Clothes washer                   |                                                              |                                  |
| (a) Domestic                     | 1½ (b)                                                       | * 1½                             |
| (b) Commercial                   | (a)                                                          | (b)                              |
| Dental unit or cuspidor          | 1¼                                                           | 1                                |
| Column 1                         | 2                                                            | 3                                |

**Table 4.9.A. (Cont'd.)**  
**Forming Part of Sentences 4.9.3.(1)**  
**and 4.10.2.(1)**

| <i>Fixture</i>                                                                                                                 | <i>Min.<br/>Size of<br/>Fixture<br/>Outlet<br/>Pipe, &amp;<br/>trap, in.</i> | <i>Hydraulic Load,<br/>fixture units</i>                      |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------|
| Dishwasher                                                                                                                     |                                                                              | no load when                                                  |
| (a) domestic type                                                                                                              | 1½                                                                           | 1½ connected to garbage<br>grinder or domestic<br>sink        |
| (b) commercial type                                                                                                            | 2                                                                            | 3                                                             |
| Drinking fountain                                                                                                              | 1¼                                                                           | ½                                                             |
| Floor drain **                                                                                                                 | 2                                                                            | 2 with 2 in. trap<br>3 with 3 in. trap                        |
| Garbage grinder, commercial type                                                                                               | 2                                                                            | 3                                                             |
| Icebox                                                                                                                         | 1¼                                                                           | 1                                                             |
| Laundry tray                                                                                                                   |                                                                              |                                                               |
| (a) single or double units or<br>2 single units with<br>common trap                                                            | 1½                                                                           | 1½                                                            |
| (b) 3 compartments                                                                                                             | 1½                                                                           | 2                                                             |
| Lavatory                                                                                                                       |                                                                              |                                                               |
| (a) barber or beauty parlor                                                                                                    | 1½                                                                           | 1½                                                            |
| (b) dental                                                                                                                     | 1¼                                                                           | 1                                                             |
| (c) domestic type, single or 2<br>single with common trap                                                                      | 1¼                                                                           | 1 with 1¼ in. trap<br>1½ with 1½ in. trap                     |
| (d) multiple or industrial type                                                                                                | 1½                                                                           | according to Table 4.10.A.                                    |
| Potato peeler                                                                                                                  | 2                                                                            | 3                                                             |
| Shower drain                                                                                                                   |                                                                              |                                                               |
| (a) from 1 head                                                                                                                | 1½                                                                           | 1½                                                            |
| (b) from 2 or 3 heads                                                                                                          | 2                                                                            | 3                                                             |
| (c) from 4 to 6 heads                                                                                                          | 3                                                                            | 6                                                             |
| Sink                                                                                                                           |                                                                              |                                                               |
| (a) domestic and other small<br>types with or without<br>garbage grinders, single,<br>double or 2 single with a<br>common trap | 1½                                                                           | 1½                                                            |
| (b) Other sinks                                                                                                                | 1½                                                                           | 1½ with 1½ in. trap<br>2 with 2 in. trap<br>3 with 3 in. trap |
| Urinal                                                                                                                         |                                                                              |                                                               |
| (a) pedestal, siphon-jet<br>or blowout type                                                                                    | 2                                                                            | 4                                                             |
| (b) stall, washout type                                                                                                        | 2                                                                            | 2                                                             |
| (c) wall                                                                                                                       |                                                                              |                                                               |
| (i) washout type                                                                                                               | 1½                                                                           | 1½                                                            |
| (ii) other types                                                                                                               | 2                                                                            | 3                                                             |
| Water closet                                                                                                                   |                                                                              |                                                               |
| (a) with flush tank                                                                                                            | 3                                                                            | 4                                                             |
| (b) with direct flush valve                                                                                                    | 3                                                                            | 6                                                             |
| Column 1                                                                                                                       | 2                                                                            | 3                                                             |

\* No load when discharged to a laundry tray.

\*\* No drainage load for emergency floor drains.

\*\*\* Bathroom group see 1.3.2.

(1) The trap inlet shall be fitted with a vertical standpipe of not less than 600 mm in height measured from the trap weir.

(2) The trap shall be sized in accordance with Sentence 4.10.3.(1).

## SUBSECTION 4.10 HYDRAULIC LOADS

(See Appendix for determination of hydraulic loads and drainage pipe sizes.)

4.10.1.(1) The hydraulic load on a pipe is the total load from:

Total loads

- every fixture that is connected to the system upstream of the pipe,
- every fixture for which provision is made for future connection upstream of the pipe, and
- all roofs and paved surfaces that drain into the system upstream of the pipe.

4.10.2.(1) The hydraulic load from a fixture that is listed in Table 4.9.A. is the number of fixture units set forth in the Table.

Hydraulic loads from fixtures

(2) Except as provided in Sentence (1), the hydraulic load from a fixture that is not listed in Table 4.9.A. is the number of fixture units set forth in Table 4.10.A. for the trap of the size that serves the fixture.

Hydraulic loads from fixtures not in Table 4.9.A.

**Table 4.10.A.**  
Forming part of Sentence 4.10.2.(2)

| Size of Trap, in. | Hydraulic Load, fixture units |
|-------------------|-------------------------------|
| 1¼                | 1                             |
| 1½                | 2                             |
| 2                 | 3                             |
| 2½                | 4                             |
| 3                 | 5                             |
| 4                 | 6                             |
| Column 1          | 2                             |

4.10.3.(1) Except as provided in Sentence (2), the hydraulic load from a fixture that produces a continuous or semi-continuous flow such as a pump or an air-conditioning fixture is 26.4 fixture units for each litre per second of flow.

Hydraulic loads from fixtures with continuous flows

- \* (2) Where a fixture or equipment or a flow controlled roof drain produces a continuous or semi-continuous flow drains to a combined sewer or to a storm sewer, the hydraulic load from the fixture is 900 L for each litre per second of flow.

- \* 4.10.4.(1) Except as provided in Sentence (2), the hydraulic load in litres from a roof or paved surface is the maximum 15 min. rainfall data provided by the authority having jurisdiction, multiplied by the sum of:

Hydraulic loads from roofs or paved surfaces

- the area in square metres of the horizontal projection of the surface that is drained, and
- one-half the area in square metres of the largest adjacent vertical surface, except when otherwise accepted. (See Appendix A.)

(2) Flow control roof drains may be installed provided:

- the maximum drain down time does not exceed 24 h,
- the roof structure has been designed to carry the load of the stored water,
- one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150 mm,
- they are located not more than 15 m from the edge of the roof and not more than 30 m from adjacent drains, and
- there is at least 1 drain for each 900 m<sup>2</sup>.

4.10.5.(1) Except as provided in Sentence 4.10.3.(2), where the hydraulic load is to be expressed in litres, fixture units shall be converted as follows:

Conversion of fixture units to litres

- (a) when the number of *fixture units* is 260 or fewer, the load is 2 360 L and  
 (b) when the number of *fixture units* exceeds 260, the load is 9.1 L for each *fixture unit*.

4.10.6.(1) Except as provided in Sentence (2), the hydraulic load that is drained to every *soil-or-waste stack* shall conform to Table 4.10.B.

(2) Where the *nominally horizontal offset* in a *soil-or-waste stack* is 1.5 m or more, the hydraulic load that is served by it shall conform to Table 4.10.C. or Table 4.10.D., whichever is the less restrictive.

**Table 4.10.B.**  
Forming Part of Sentence 4.10.6.(1)

| Size of Stack, in. | Maximum Load on Soil-or-Waste Stack, <i>fixture units</i>   |                                                               |                                                                              |
|--------------------|-------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------|
|                    | Maximum load on stack that passes through 3 storeys or less | Maximum load on stack that passes through more than 3 storeys | Maximum load to be drained to stack of more than 3 storeys from any 1 storey |
| 1¼                 | 2                                                           | 2                                                             | 2                                                                            |
| 1½                 | 5                                                           | 8                                                             | 2                                                                            |
| 2                  | 10                                                          | 24                                                            | 6                                                                            |
| 2½                 | 20                                                          | 42                                                            | 9                                                                            |
| 3                  | 60                                                          | 60                                                            | 16                                                                           |
| 4                  | 240                                                         | 500                                                           | 90                                                                           |
| 5                  | 540                                                         | 1,100                                                         | 200                                                                          |
| 6                  | 960                                                         | 1,900                                                         | 350                                                                          |
| 8                  | 2,200                                                       | 3,600                                                         | 600                                                                          |
| 10                 | 3,800                                                       | 5,600                                                         | 1,000                                                                        |
| 12                 | 6,000                                                       | 8,400                                                         | 1,500                                                                        |
| Column 1           | 2                                                           | 3                                                             | 4                                                                            |

Hydraulic loads on branches

4.10.7 The hydraulic load that is drained to a *branch* shall conform to Table 4.10.C.

**Table 4.10.C.**  
Forming Part of Article 4.10.7. and Sentence 4.10.6.(2)

| Size of Branch, in. | Maximum Load on Branch, <i>fixture units</i> |
|---------------------|----------------------------------------------|
| 1¼                  | 2                                            |
| 1½                  | 3                                            |
| 2                   | 6                                            |
| 2½                  | 12                                           |
| 3                   | 27                                           |
| 4                   | 180                                          |
| 5                   | 390                                          |
| 6                   | 700                                          |
| 8                   | 1,600                                        |
| 10                  | 2,500                                        |
| 12                  | 3,900                                        |
| Column 1            | 2                                            |

- \* 4.10.8 The hydraulic load that is drained to a *sanitary building drain* or a *sanitary building sewer* shall conform to Table 4.10.D.

Hydraulic loads  
on sanitary  
building drains  
or sewers

**Table 4.10.D.**  
Forming Part of Article 4.10.8. and Sentence 4.10.6.(2)

| Size of<br>Drain or<br>Sewer, in. | Maximum Load on Drain or Sewer, fixture units |          |          |          |         |         |
|-----------------------------------|-----------------------------------------------|----------|----------|----------|---------|---------|
|                                   | Slope                                         |          |          |          |         |         |
|                                   | 1 in 400                                      | 1 in 200 | 1 in 133 | 1 in 100 | 1 in 50 | 1 in 25 |
| 3                                 | —                                             | —        | —        | —        | 27      | 36      |
| 4                                 | —                                             | —        | —        | 180      | 240     | 300     |
| 5                                 | —                                             | —        | 380      | 390      | 480     | 670     |
| 6                                 | —                                             | —        | 600      | 700      | 840     | 1,300   |
| 8                                 | —                                             | 1 400    | 1 500    | 1 600    | 2 250   | 3 370   |
| 10                                | —                                             | 2 500    | 2 700    | 3 000    | 4 500   | 6 500   |
| 12                                | 2 240                                         | 3 900    | 4 500    | 5 400    | 8 300   | 13 000  |
| 15                                | 4 800                                         | 7 000    | 9 300    | 10 400   | 16 300  | 22 500  |
| Column 1                          | 2                                             | 3        | 4        | 5        | 6       | 7       |

- \* 4.10.9 The hydraulic load that is drained to a horizontal *leader*, a *storm building drain*, a *storm building sewer*, a *combined building drain* or a *combined building sewer* shall conform to Table 4.10.E.

Hydraulic loads  
on storm; or  
combined  
building drains  
or sewers

**Table 4.10.E.**  
Forming Part of Article 4.10.9.

| Size of<br>Drain or<br>Sewer, in. | Maximum Load on Drain or Sewer, L |          |          |          |         |         |         |
|-----------------------------------|-----------------------------------|----------|----------|----------|---------|---------|---------|
|                                   | Slope                             |          |          |          |         |         |         |
|                                   | 1 in 400                          | 1 in 200 | 1 in 133 | 1 in 100 | 1 in 68 | 1 in 50 | 1 in 25 |
| 3                                 | —                                 | —        | —        | —        | 2 390   | 2 770   | 3 910   |
| 4                                 | —                                 | —        | —        | 4 220    | 5 160   | 5 970   | 8 430   |
| 5                                 | —                                 | —        | 6 760    | 7 650    | 9 350   | 10 800  | 15 300  |
| 6                                 | —                                 | —        | 10 700   | 12 400   | 15 200  | 17 600  | 24 900  |
| 8                                 | —                                 | 18 900   | 23 200   | 26 700   | 32 800  | 37 800  | 53 600  |
| 10                                | —                                 | 34 300   | 41 900   | 48 500   | 59 400  | 68 600  | 97 000  |
| 12                                | 37 400                            | 55 900   | 68 300   | 78 700   | 96 500  | 112 000 | 158 000 |
| 15                                | 71 400                            | 101 000  | 124 000  | 143 000  | 175 000 | 202 000 | 287 000 |
| Column 1                          | 2                                 | 3        | 4        | 5        | 6       | 7       | 8       |

**4.10.10.** The hydraulic load that is drained to a *roof gutter* shall conform to Table 4.10.F.

**Table 4.10.F.**  
Forming Part of Article 4.10.10.

| Size of Gutter, in. | Size of Gutter cm <sup>2</sup> | Maximum Load on Gutter, L |          |         |         |
|---------------------|--------------------------------|---------------------------|----------|---------|---------|
|                     |                                | Slope of Gutter           |          |         |         |
|                     |                                | 1 in 200                  | 1 in 100 | 1 in 50 | 1 in 25 |
| 3                   | 22.8                           | 406                       | 559      | 812     | 1 140   |
| 4                   | 40.5                           | 838                       | 1 190    | 1 700   | 2 410   |
| 5                   | 63.3                           | 1 470                     | 2 080    | 2 950   | 4 170   |
| 6                   | 91.2                           | 2 260                     | 3 200    | 4 520   | 6 530   |
| 7                   | 124.1                          | 3 250                     | 4 600    | 6 500   | 9 190   |
| 8                   | 162.1                          | 4 700                     | 6 600    | 9 400   | 13 200  |
| 10                  | 253.4                          | 8 480                     | 12 000   | 17 000  | 23 600  |
| Column 1            | 2                              | 3                         | 4        | 5       | 6       |

Hydraulic loads on leaders

\* **4.10.11.** The hydraulic load that is drained to a vertical internal *leader* shall conform to Table 4.10.G. except that the *size of one roof drain and one leader* shall be at least three inches (3") when such *roof drain and leader* services a roof area greater than 185 m<sup>2</sup>.

**Table 4.10.G.**  
Forming Part of Article 4.10.11.

| Circular Leader     |              | Non-Circular Leader            |              |
|---------------------|--------------|--------------------------------|--------------|
| Size of Leader, in. | Max. Load, L | Area of Leader cm <sup>2</sup> | Max. Load, L |
| 2                   | 1 700        | 20.3                           | 1 520        |
| 2½                  | 3 070        | 31.6                           | 2 770        |
| 3                   | 5 000        | 45.6                           | 4 500        |
| 4                   | 10 800       | 81.1                           | 9 700        |
| 5                   | 19 500       | 126.6                          | 17 600       |
| 6                   | 31 800       | 182.4                          | 28 700       |
| 8                   | 68 300       | 324.3                          | 61 500       |
| Column 1            | 2            | 3                              | 4            |

\* **4.10.12.(1)** Notwithstanding 4.10.4.1., 4.10.4.2. and 4.10.9., storm sewers may be designed in accordance with good engineering practice.

\* **(2)** The design velocity in storm sewers shall be not less than 0.60 m/s.

## SECTION 5 VENTING SYSTEMS

### SUBSECTION 5.1 VENT PIPES FOR TRAPS

5.1.1.(1) Except as provided in Sentences (2) and (3), a *trap* shall be protected by a *vent pipe*.

Venting for  
traps

Exception for  
floor drains

(2) A *trap* that serves a floor drain need not be protected where:

- (a) the *size* of the *trap* is at least 3 in.,
- (b) the length of the *fixture drain* is at least 450 mm, and
- (c) the fall on the *fixture drain* does not exceed its *size*. (See Appendix.)

(3) A *trap* need not be protected by a *vent pipe*:

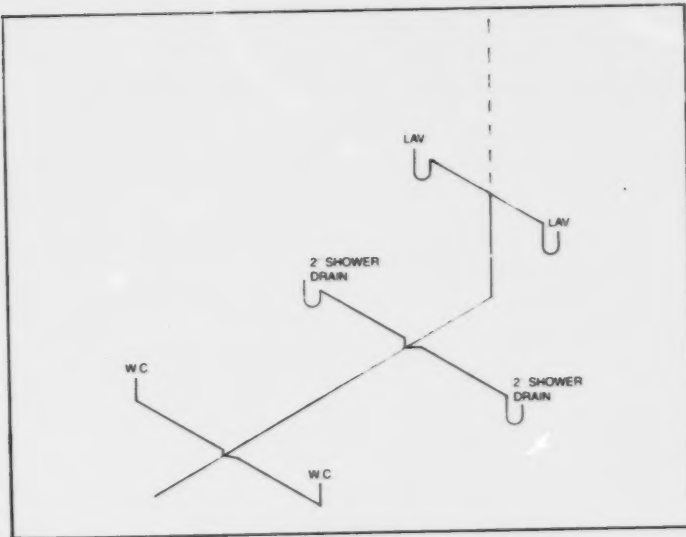
- (a) where it serves a *subsoil drainage pipe*,
- (b) where it serves a *storm drainage system*, or
- (c) where it forms part of an *indirectly connected drainage system*.

### \* SUBSECTION 5.2 WET VENTING

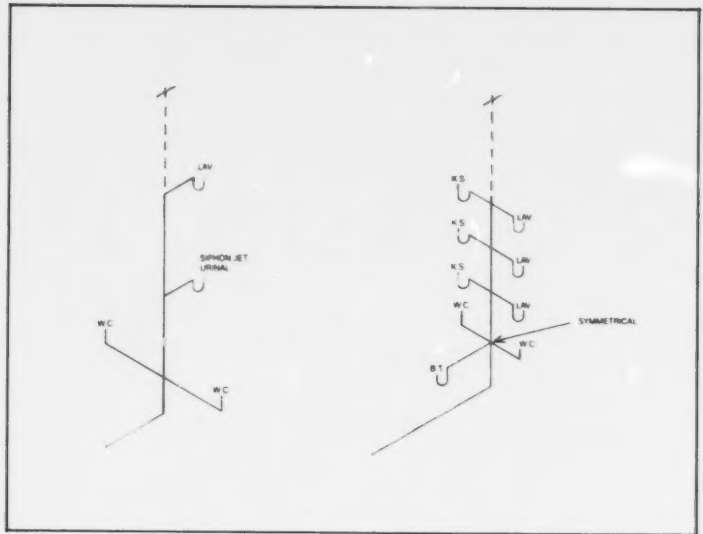
5.2.1.(1) A *vent pipe* may serve as a *wet vent* provided:

Wet venting

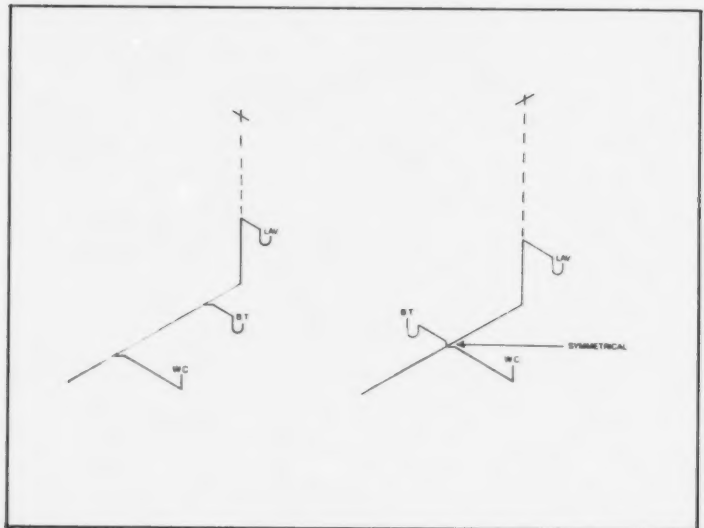
- (a) the *hydraulic load* is in accordance with Table 5.8.A.,
- (b) the number of wet vented water closets does not exceed 2.



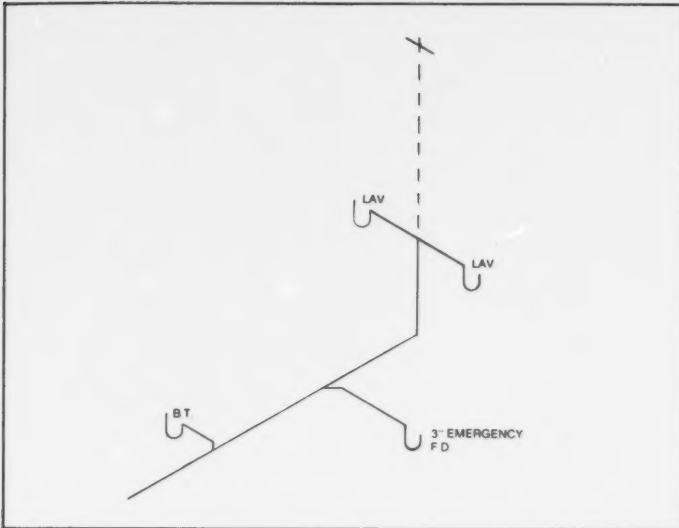
- (c) when 2 water closets are installed they are connected at the same level by means of an acceptable double fitting,



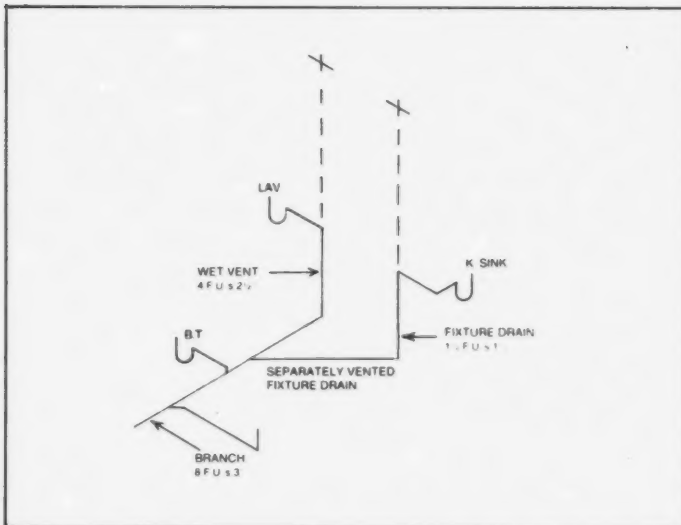
- (d) the water closets are installed downstream of all other fixtures,

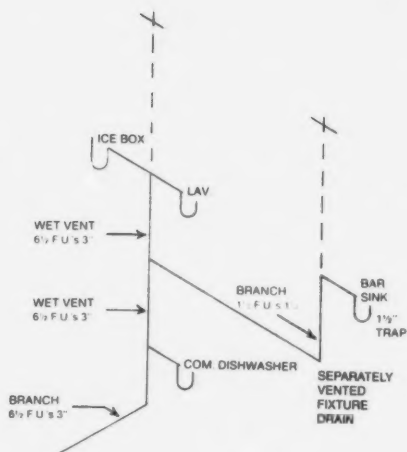
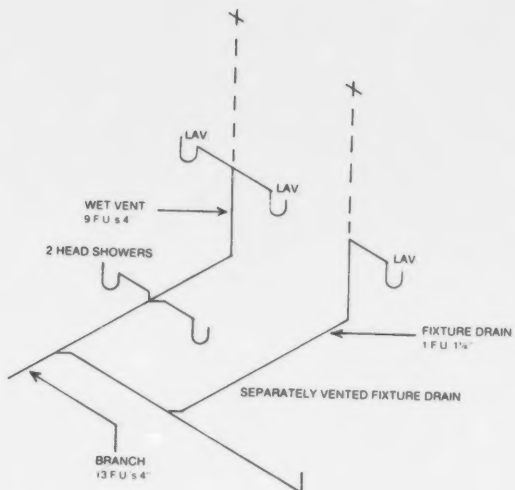


- (e) except for water closets, and *emergency floor drains* in accordance with Sentence 5.1.1.(2) *trap arms* and *fixture drains* connected to the *wet vent* do not exceed 2 inches in size,

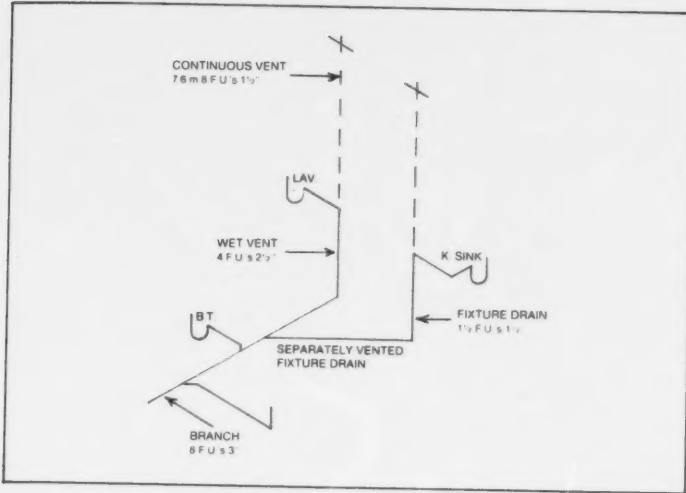


- (f) a *wet vent* or a wet vented water closet *trap arm* may receive separately vented maximum 2 *fixture unit* fixtures, provided the total load on the *wet vent* does not exceed the limits stated in Table 5.8.A.,

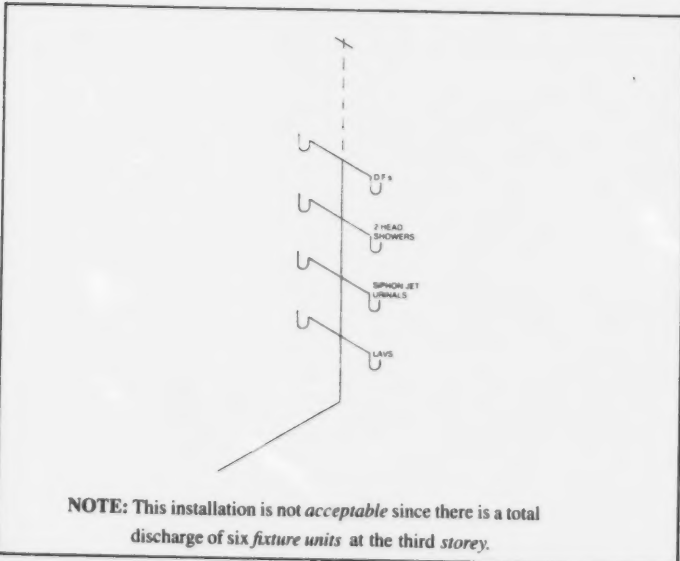




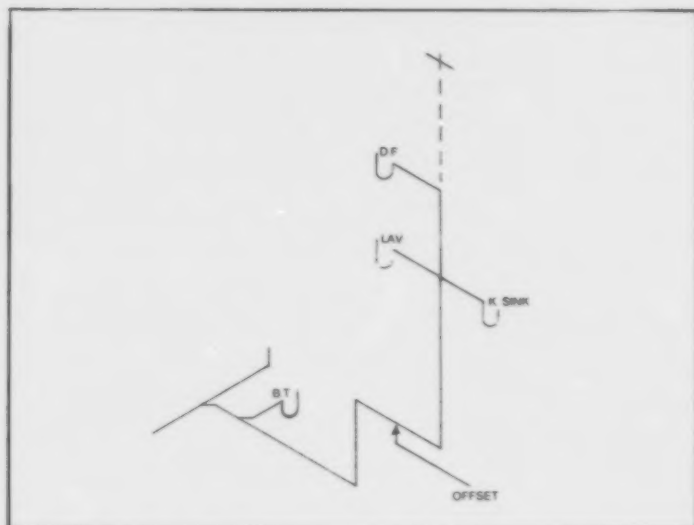
- (g) when sizing a *continuous vent* that serves a *wet vent* the load to be considered shall include the total load drained into the *wet vent*,



- (h) for a *wet vent* that extends through more than 2 storeys, the total discharge from any one storey above the second storey does not exceed four fixture units,

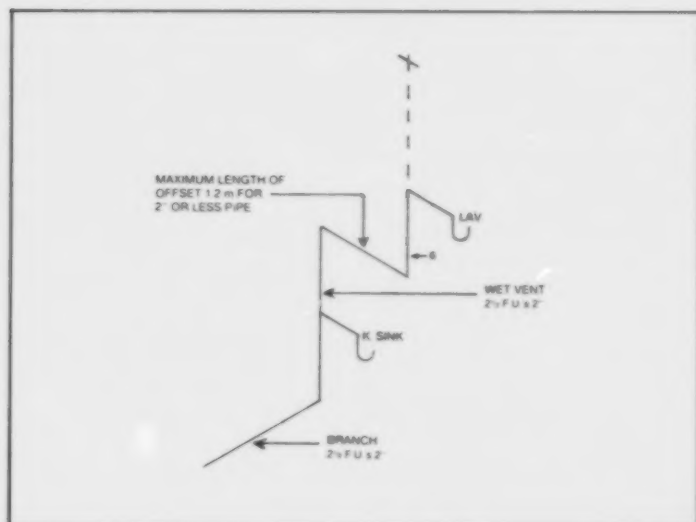


(i) there is not more than one nominally horizontal offset in the wet vent, and

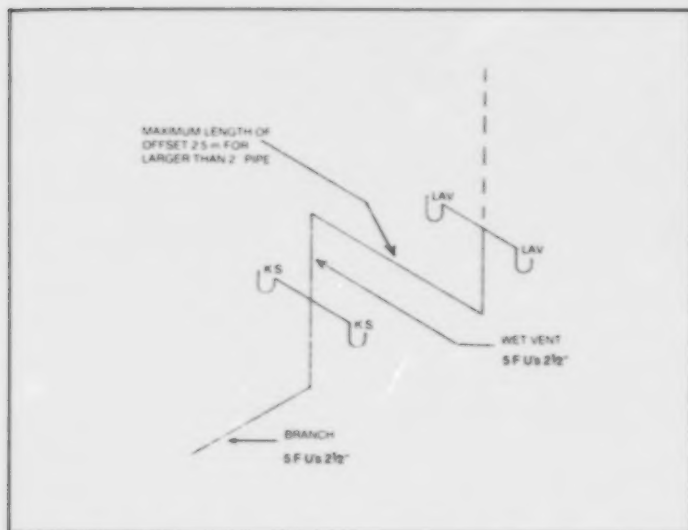


the offset:

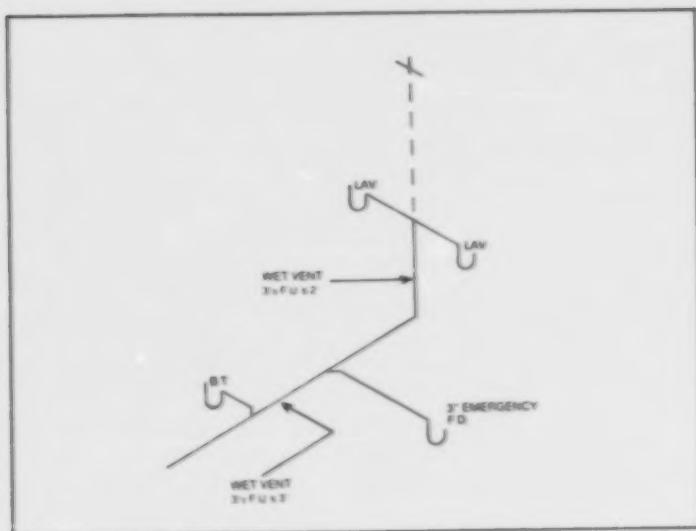
(i) does not exceed 1.2 m for pipe sizes 2 inches or less, and



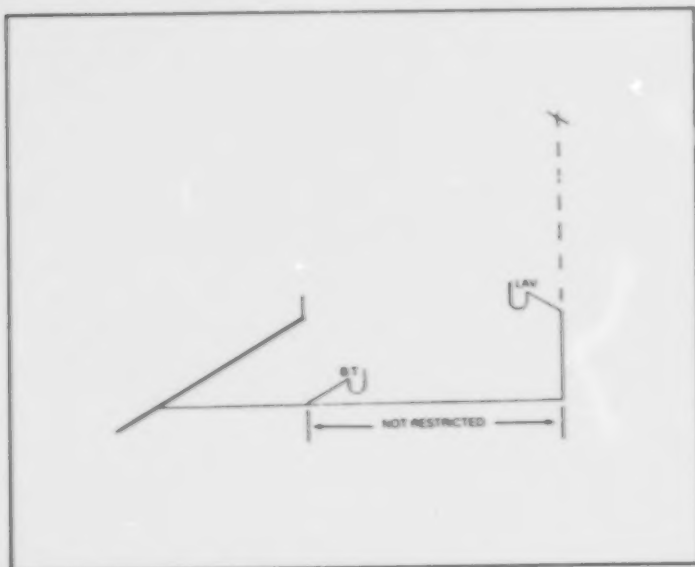
- (ii) does not exceed 2.5 m for pipe sizes larger than 2 inches,



- (j) except for upstream of *emergency floor drains* in accordance with Clause 5.2.1.(1)(e), the wet vented portion shall not be reduced in size.

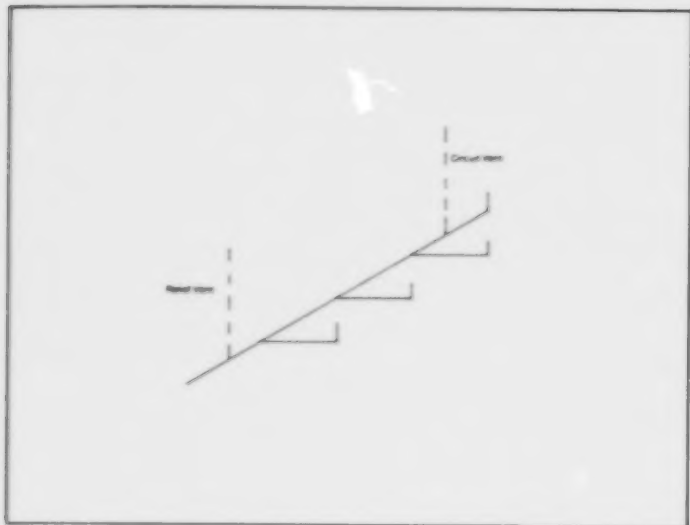


(k) The length of a wet vent is not restricted.

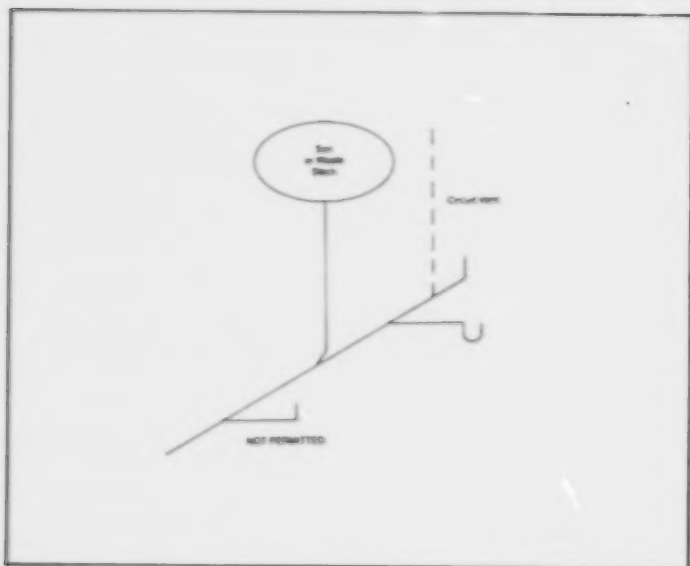


### • SUBSECTION 5.3 CIRCUIT VENTING

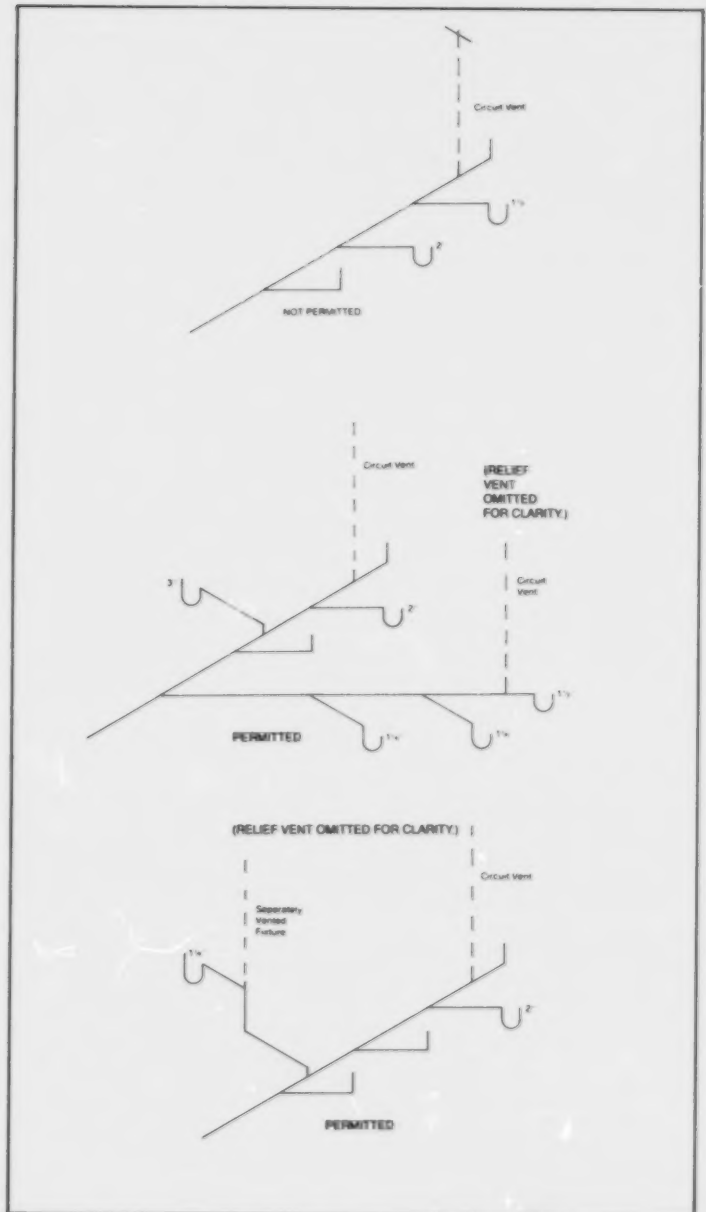
5.3.1.(1) A section of a horizontal branch or building drain may be circuit vented providing:



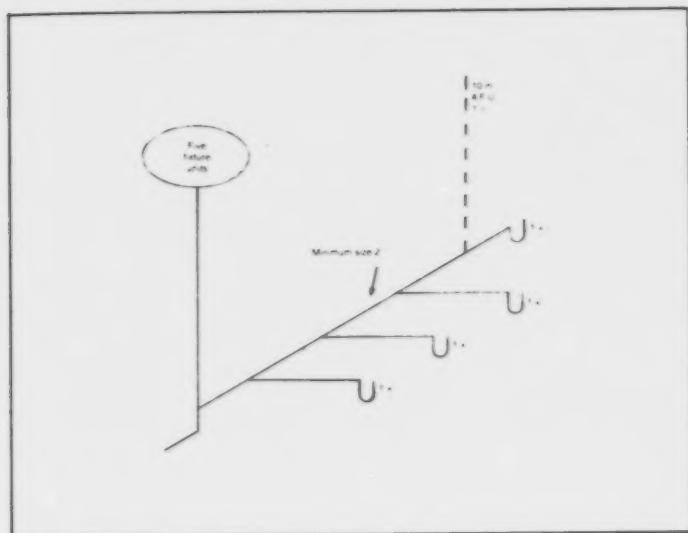
- (a) all fixtures served by the circuit vent are located in the same storey,
- (b) no soil or waste stack is connected to it upstream of a circuit vented fixture.



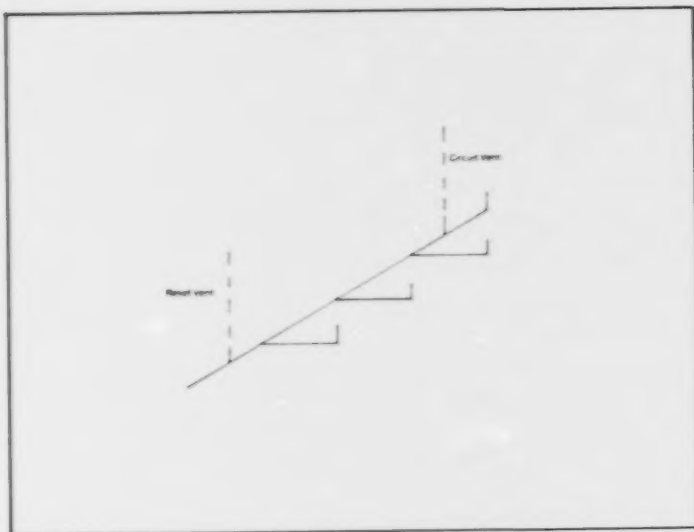
(c) fixtures, with fixture outlet pipes less than 2 inches in size, are separately vented, or separately circuit vented.



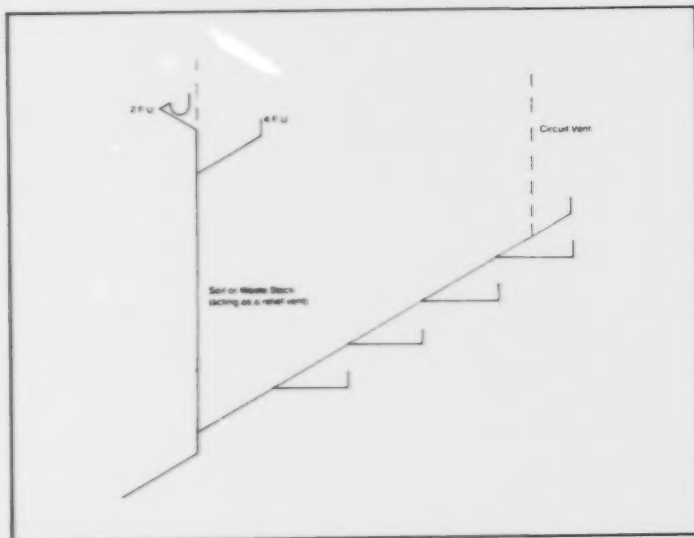
(d) the minimum size is not less than 2 inches.

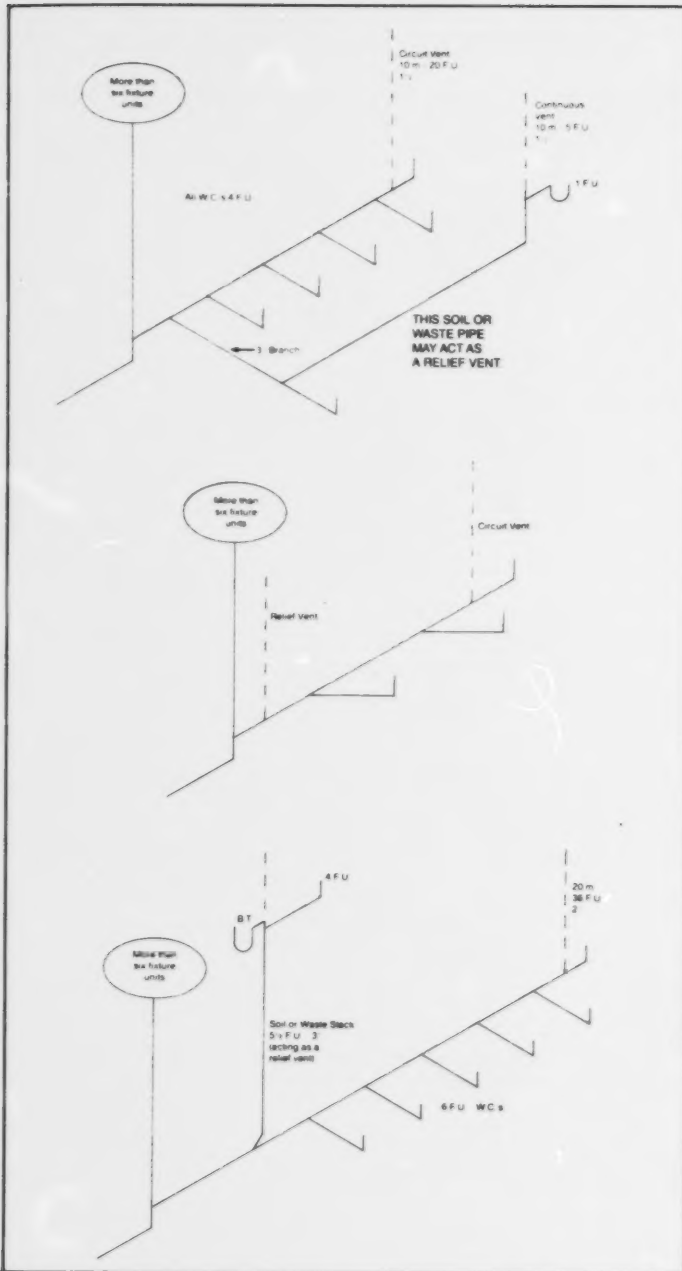


(2) A *relief vent* shall be connected to the *branch or building drain* that forms part of a circuit vented system, downstream of the connection of the most downstream circuit vented fixtures:

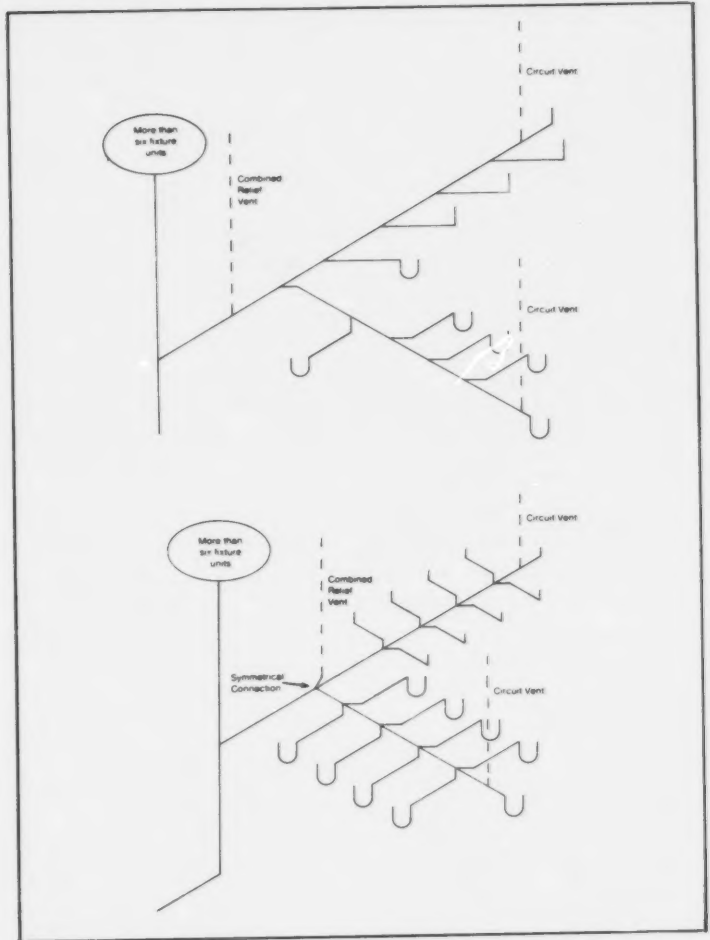


(a) providing the load does not exceed six fixture units, a *soil or waste pipe* may act as a *relief vent* for a branch or building drain that is circuit vented.





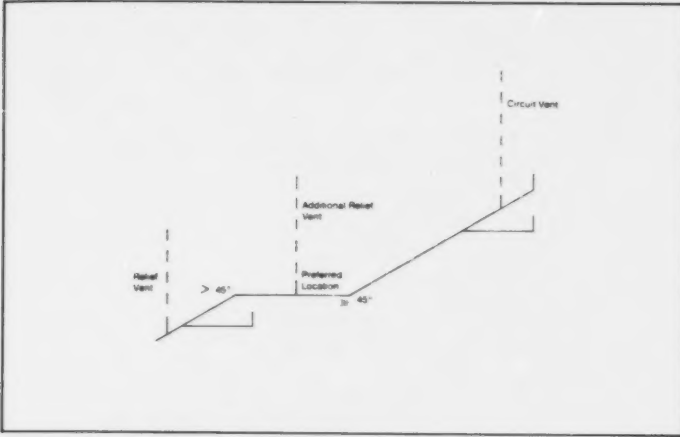
- (b) a *relief vent* may serve as a combined *relief vent* for two or more *branches* or *building drains* that are circuit vented; provided there are not more than eight (8) circuit vented *fixtures* connected between the combined *relief vent* and the *circuit vents*.



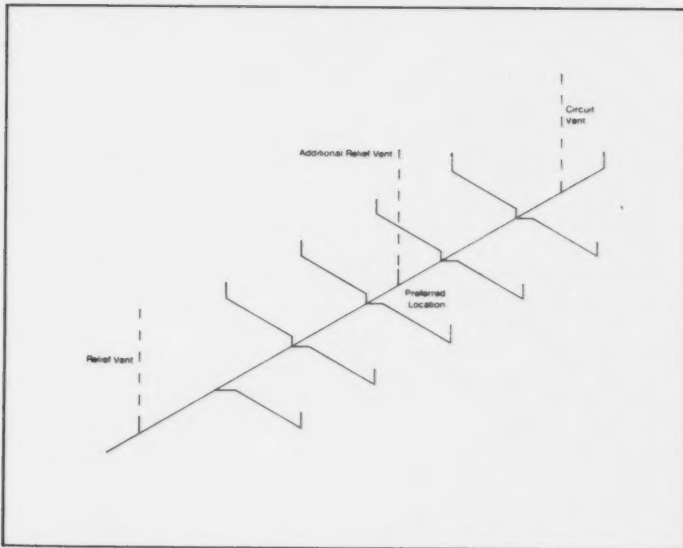
- (c) Circuit vented *fixtures* must be vented by a *vent* connected to the *fixture drain* of the most upstream *fixture* and a *relief vent* must be provided in conformance with Sentence 5.3.1.(2).

(3) Additional relief vents shall be required:

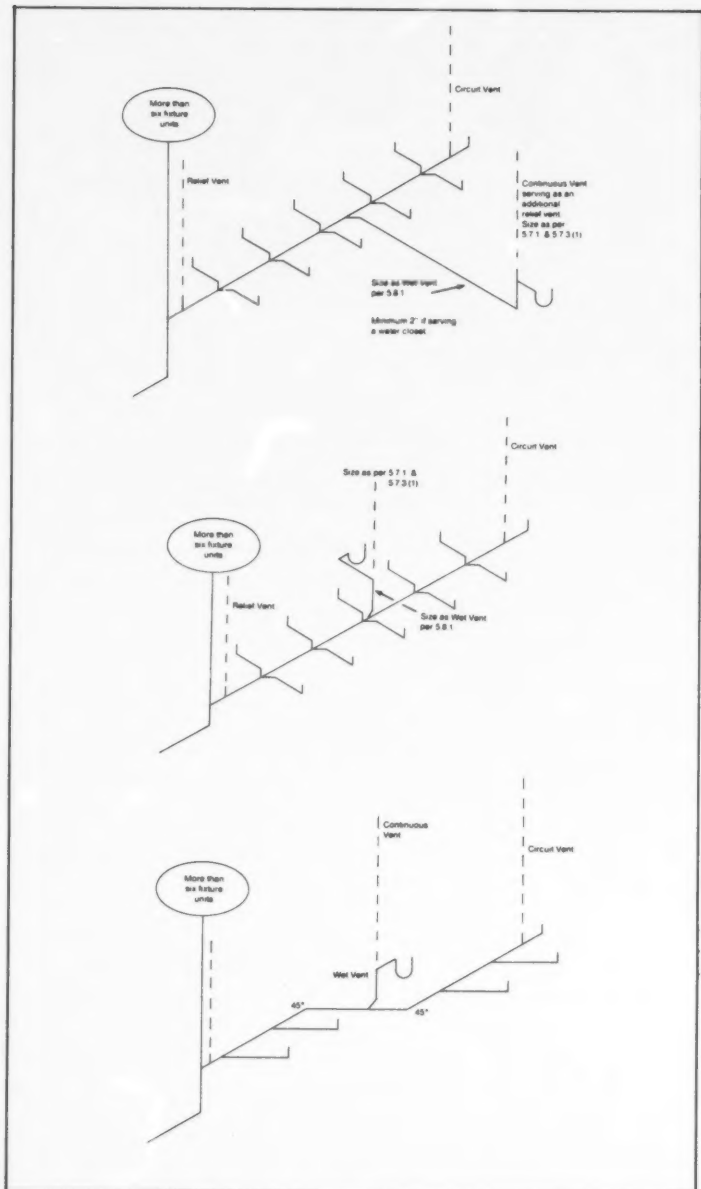
- (a) when each cumulative horizontal change in direction in the *branch or building drain*, served by the *circuit vent*, exceeds 45 degrees between *vent pipes*,



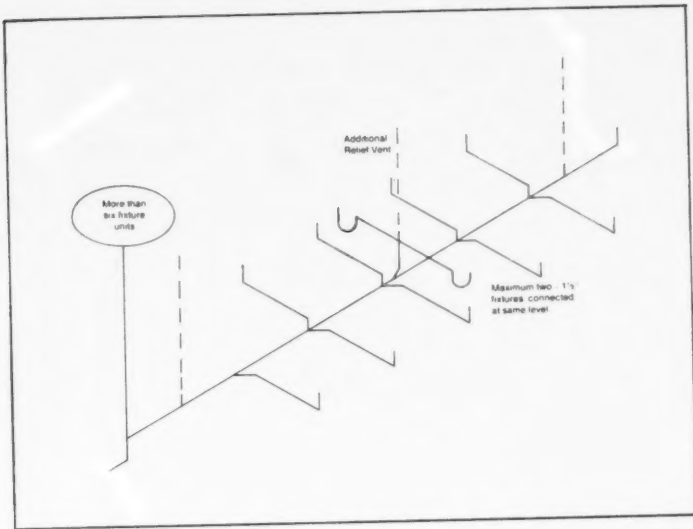
- (b) so that there are not more than eight (8) circuit vented *fixtures* connected to the *branch or building drain*, between *vent pipe* connections.



(4) A soil or waste pipe that is extended as a *continuous vent*, may serve as an additional *relief vent*, in accordance with Sentence 5.3.1.(3); provided that the *soil or waste pipe* is sized as a *wet vent* in conformance with Article 5.8.1.

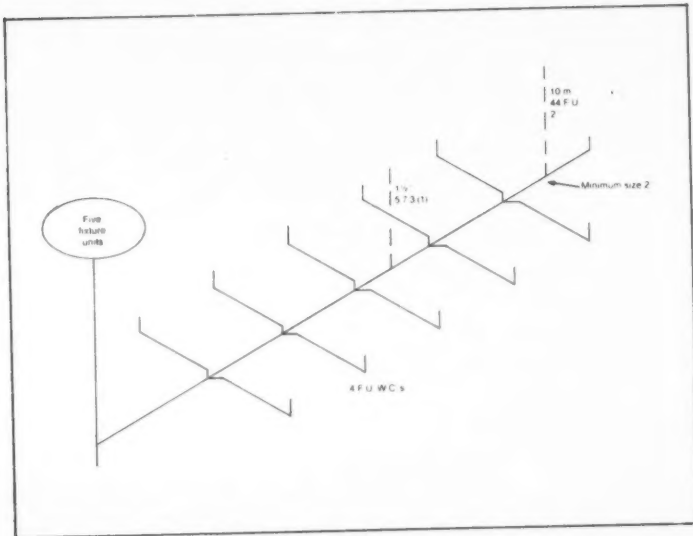


- (5) Connections to additional *relief vents* in accordance with Article 5.3.1.(3) shall conform to; connections to a *circuit vent*; Clause 4.2.1.(1)(e).

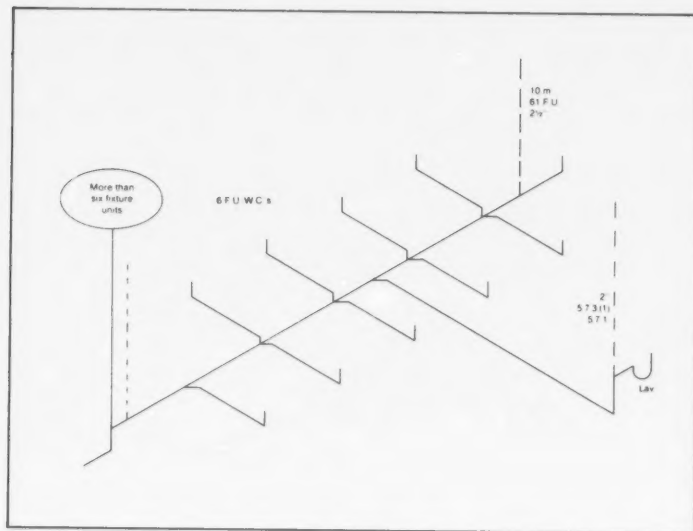


- (6) Size the *branch or building drain* in accordance with Subsections 4.9 and 4.10., minimum size 2" including fixture drain downstream of *circuit vent* connection.

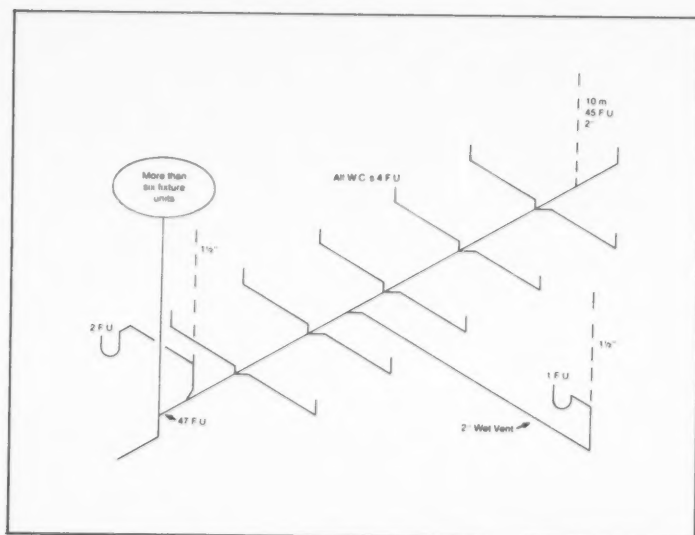
- (7) Size the additional *relief vents* in accordance with Sentence 5.7.3.(1).

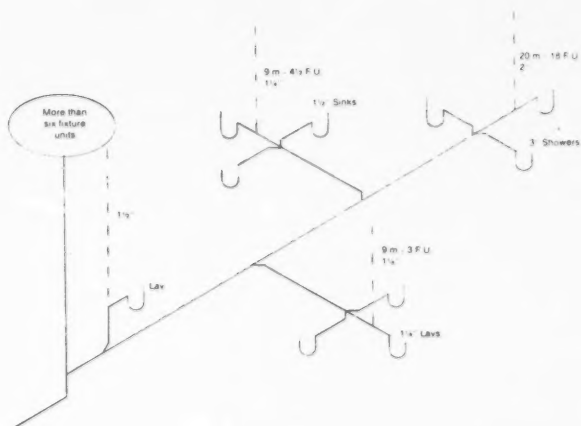
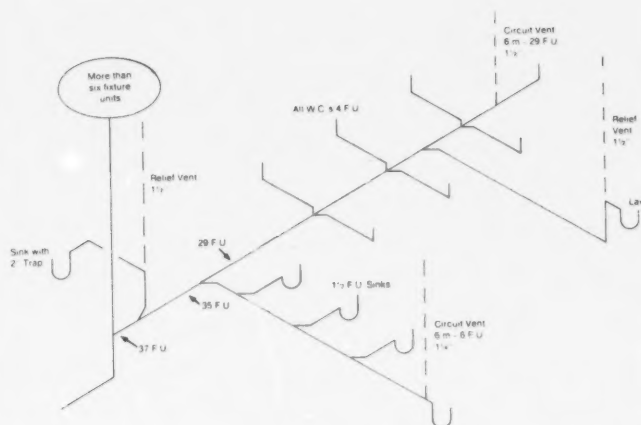


- (8) Size the *continuous vent* serving the additional *relief vent* in accordance with Sentence 5.7.3.(1).

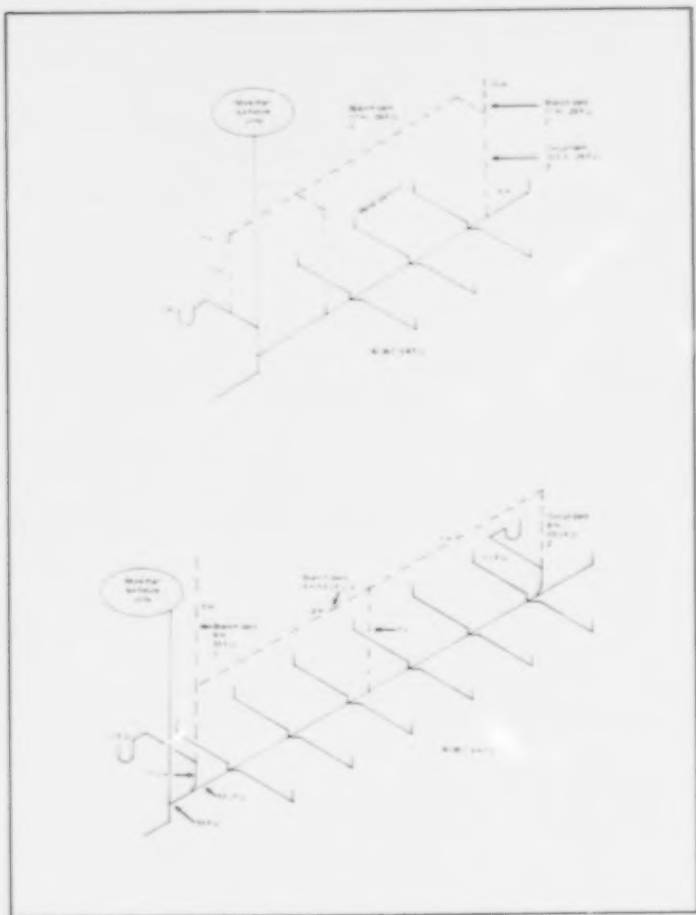


- (9) The load on the *circuit vent* shall include the load from *fixtures* connected to the *branch* or *building drain* served by the *circuit vent*; except those included in Clause 5.3.1.(2)(a) and (b) and separately circuit vented *branches* connected downstream, of the most downstream circuit vented *fixture*.





- (10) The load on a branch vent, serving a relief vent and another vent, includes the load served by all the vents served by the branch vent.



#### SUBSECTION 5.4 VENT PIPES FOR SOIL-OR-WASTE STACKS

- Stack vents 5.4.1.(1) The upper end of every *soil-or-waste stack* shall terminate in a *stack vent*.
- Stack venting (2) A *stack vent* may serve as the *vent pipe* for 1 or 2 *fixtures* connecting at the same level. (See Appendix.)
- Vent stack \* 5.4.2.(1) A *stack vent* shall be installed to protect the base of every *soil-or-waste stack*, other than a *soil-or-waste stack* that serves as a wet vent that has *fixtures* draining to it on more than four (4) *storeys*.
- (2) The *vent stack* shall be connected to the *soil-or-waste stack* at or below the lowest *soil-or-waste pipe* connection, or at the junction of the *soil-or-waste stack* with a *branch* or *building drain*. (See Appendix.)

**5.4.3.(1)** Except as provided in Sentence (4), where a *soil-or-waste stack* receives the discharge from *fixtures* located on more than 11 *storeys* a *yoke vent* shall be installed:

Yoke vent

- (a) for each section of 5 *storeys* or part thereof on which *fixtures* are located other than the top and bottom 5 *storeys*, and
- (b) at or immediately above each *offset* or *double offset*.

(2) The *yoke vent* shall be connected to the *soil-or-waste stack* by means of a *drainage fitting* at or immediately below the lowest *soil-or-waste pipe* from the lowest *storey* of the section described in Sentence (1).

(3) The *yoke vent* shall be connected to the *vent stack* at least 1 m above the floor level of the lowest *storey* in the section described in Sentence (1).

(4) A required *yoke vent* need not be installed provided the *soil-or-waste stack* is interconnected to the *vent stack* in each *storey* of the section in which *fixtures* are located by means of a *vent* equal in size to the *branch* or *fixture drain* or 2 in., whichever is smaller.

**5.4.4.** A *soil-or-waste stack* that has a *nominally horizontal offset* more than 1.5 m long and above which the upper vertical portion of the stack passes through more than 2 *storeys* and receives a hydraulic load of more than 100 *fixture units* shall be vented by a *relief vent* either

Relief vents

- (a) connected to the vertical section immediately above the *offset*,
- (b) connected to the lower vertical section at or above the highest *soil-or-waste pipe* connection, or
- (c) extended as a vertical continuation of the lower section. (See Appendix A.)

## SUBSECTION 5.5 MISCELLANEOUS VENT PIPES

**5.5.1.** Every sump that receives *sewage* shall be provided with a *vent pipe* that is connected to the top of the sump.

Venting of  
sewage sumps

**5.5.2.(1)** Every oil *interceptor* shall be provided with 2 *vent pipes* that:

Venting of oil  
interceptors

- (a) connect to the *interceptor* at opposite ends,
- (b) extend independently to open air, and
- (c) terminate at elevations differing by at least 300 mm.

(2) Adjacent compartments within every oil *interceptor* shall be connected to each other by a vent opening.

**5.5.3.** Where a *building trap* is installed, a *fresh air inlet* not less than 4 in. in size shall be connected upstream and within 1.2 m of the *building trap* and downstream of any other connection. (See Appendix explaining Sentence 4.5.4.(1).)

Fresh air  
inlets

**5.5.4.** Where provision is made for a *fixture* to be installed in the future, the *drainage system* and *venting system* shall be sized accordingly and provision made for the necessary future connections.

## SUBSECTION 5.6 ARRANGEMENT OF VENT PIPES

**5.6.1.** Every *vent pipe* shall be installed without depressions in which moisture can collect.

Drainage of  
vent pipes

\* **5.6.2.(1)** Every *vent pipe* shall be connected as directly as possible from its lower end to outside air.

Vent pipe  
connections

(2) Except for *wet vents*, where a *vent pipe* is connected to a *nominally horizontal soil-or-waste pipe*, the connection shall be above the horizontal centre line of the *soil-or-waste pipe*. (See Appendix.)

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location of vent pipes                     | <p><b>5.6.3.(1)</b> Except as provided in Sentences (2) and (3), a vent pipe that protects a fixture trap shall be located so that:</p> <ul style="list-style-type: none"> <li>(a) the developed length of the trap arm is:             <ul style="list-style-type: none"> <li>(i) not less than twice the size of the fixture drain, and</li> <li>(ii) sized in accordance with Table 5.7.A.</li> </ul> </li> <li>(b) the total fall of the trap arm is not greater than the size of the fixture drain, and</li> <li>(c) the trap arm does not have a cumulative change of direction of more than 135° (See Appendix.)</li> </ul> <p>(2) The trap arm of water closets, S-trap standards or fixtures that depend on siphonic action for the proper functioning of the fixture that discharges vertically shall not have a cumulative change of direction of more than 225° (See Appendix.)</p> <p>• (3) A vent pipe that protects a water closet or a fixture that depends on siphonic action for its proper functioning shall be so located that the distance between the connection of the fixture drain to the fixture and the vent pipe shall not exceed 1 m in the vertical plane. (See Appendix.)</p>                                                                                                                                                                                                                |
| Vents to connect above fixtures they serve | <p>• <b>5.6.4.(1)</b> Except for a wet vent and an island fixture vent, a vent pipe shall extend vertically not less than 150 mm above the flood level rim of every fixture that it serves before being connected to another vent pipe.</p> <p>(2) No vent pipe shall be connected to a branch vent or a vent stack in such a manner that a blockage in a soil-or-waste pipe would cause waste to drain through the vent pipe to the drainage system.</p> <p><b>5.6.5.(1)</b> The upper end of every vent pipe that is not terminated in open air shall be connected to a venting system that is terminated in open air.</p> <p>• (2) The upper end of every vent pipe that is terminated in open air, other than a vent pipe that serves an oil interceptor or a fresh air inlet, shall be extended above a roof.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Terminals                                  | <p>(3) Except for a fresh air inlet where a vent pipe is terminated in open air the terminal shall be located:</p> <ul style="list-style-type: none"> <li>(a) at least 1 m above or at least 3.5 m in any other direction from every air inlet, operable window or door,</li> <li>(b) at least 2 m above or at least 3.5 m in any other direction from a roof that supports an occupancy,</li> <li>(c) at least 2 m above ground, and</li> </ul> <p>• (d) at least 1.8 m from every property line except when a property line is adjacent to a street. (See Appendix.)</p> <p>• (4) Where a vent pipe extends above a roof it shall:</p> <ul style="list-style-type: none"> <li>(a) Except as provided in Sentence (5), terminate high enough to prevent the entry of roof drainage but at least 150 mm above the roof, and</li> <li>(b) be flashed to prevent the entry of water between the vent pipe and the roof. (See Article 2.9.11. for vent pipe flashings.)</li> </ul> <p>• (5) Where a vent pipe may be subject to frost closure it shall be protected from frost closure:</p> <ul style="list-style-type: none"> <li>(a) by keeping its height to a minimum,</li> <li>(b) by being increased at least 1 inch in size immediately before penetrating a roof,</li> <li>(c) by being insulated, or</li> </ul> <p>• (d) by being protected in some other manner acceptable to the authority having jurisdiction.</p> |

## SUBSECTION 5.7 MINIMUM SIZE OF VENT PIPES

5.7.1 The size of every vent pipe shall conform to Table 5.7.A.

General

**Table 5.7.A.**  
Forming Part of Article 5.7.1.

| Size of Trap Served, in. | Minimum Size of Vent Pipe, in. | Maximum Developed Length of Trap Arm m. |
|--------------------------|--------------------------------|-----------------------------------------|
| 1¼                       | 1¼                             | 1.2                                     |
| 1½                       | 1¼                             | 1.5                                     |
| 2                        | 1½                             | 1.5                                     |
| 2½                       | 1½                             | 1.5                                     |
| 3                        | 1½                             | 1.8                                     |
| 4                        | 1½                             | 3.0                                     |
| 5                        | 2                              | 4                                       |
| 6                        | 2                              | 5                                       |
| Column 1                 | 2                              | 3                                       |

5.7.2 A branch vent, stack vent, vent stack or header shall be of a size not less than the size of a vent pipe that is connected to it.

5.7.3.(1) Except as provided in Article 5.7.1, the minimum size of a relief vent installed in conjunction with a circuit vent shall be 1 size smaller than the required size of the circuit vent.

Relief vents

(2) Except as provided in Article 5.7.1, the minimum size of a relief vent installed in conjunction with an offset in a soil-or-waste stack shall be 1 size smaller than the stack vent.

5.7.4. Except as provided in Article 5.7.1., the minimum size of a yoke vent shall be 1 size smaller than the size of the smaller pipe to which it is connected.

Yoke vents

5.7.5. The minimum size of a vent pipe that serves a manhole within a building shall be 2 in.

Sewage sump vents

5.7.6.(1) Except as provided in Sentence (2), the minimum size of the vent pipe for a sewage sump shall be 1 size smaller than the size of the largest inlet to the sump.

(2) The minimum size of every vent pipe for a sewage sump shall be 2 in., but the vent pipe need not be larger than 4 in.

5.7.7. The minimum size of every vent pipe that serves an oil interceptor shall be 2 in.

Oil interceptors

## SUBSECTION 5.8 SIZING OF VENT PIPES

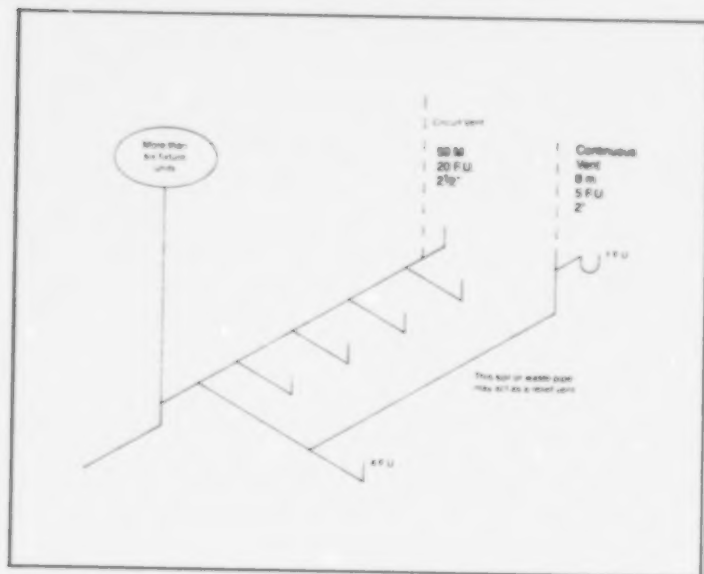
(See Appendix for an explanation of sizing of vent pipes.)

\* 5.8.1.(1) A wet vent shall be sized in accordance with Table 5.8.A.

**Table 5.8.A.**  
Forming Part of Article 5.8.1.

| Size of Wet Vent in. | Maximum Hydraulic Load, Fixture Units |                                         |
|----------------------|---------------------------------------|-----------------------------------------|
|                      | Not Serving Water Closets             | Serving not more than two water closets |
|                      |                                       | Fixtures Other than Water Closets       |
| 1½                   | 2                                     | N/A                                     |
| 2                    | 4                                     | 3                                       |
| 2½                   | 6                                     | 4                                       |
| 3                    | 12                                    | 6                                       |
| 4                    | 36                                    | 14                                      |
| 5                    | N/A                                   | 18                                      |
| 6                    | N/A                                   | 23                                      |
| Column 1             | 2                                     | 3                                       |

- \* (2) The *relief vent*, in accordance with Clause 5.3.1.(2)(a) shall be sized in conformance with Table 5.8.B., Table 5.8.C., Article 5.7.1., or Sentence 5.7.3.(1) (whichever size is the largest), including the load drained into the *soil or waste pipe*.



- \* (3) Size the additional *relief vents* in accordance with Article 5.7.1. and Sentence 5.7.3.(1).
- \* (4) Size *continuous vents* serving additional *relief vents* in accordance with Article 5.7.1. and Sentence 5.7.3.(1).
- \* (5) The load on the *circuit vent* includes all *fixtures* connected to the *branch* or *building drain* served by the *circuit vent*; except those included in Clause 5.3.(2)(a) and (b) and separately *circuit vented branches* connected downstream of the most downstream *circuit vented fixture*.
- \* (6) Size the combined *relief vent* minimum one size smaller than the largest *circuit vent* served and Article 5.7.1.
- \* 5.8.2.(1) A *circuit vent*, a *branch vent*, a *header* and a *continuous vent*, other than one that is an *individual vent* or a *dual vent*, shall be sized in conformance with Table 5.8.B.
- \* (2) The length of a *continuous vent* for the purpose of Table 5.8.B. shall be its *developed length* from the vertical *soil-or-waste pipe* to a *vent stack*, *stack vent*, *header* or *open air*.
- \* (3) The length of a *circuit vent* for the purpose of Table 5.8.B. shall be its *developed length* from the horizontal *soil-or-waste pipe* to a *vent stack*, *stack vent*, *header* or *open air*.
- \* (4) The length of a *branch vent* for the purpose of Table 5.8.B. shall be the *developed length* of vent piping from the most distant *soil-or-waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

- \* (5) The length of a *header* for the purpose of Table 5.8.B, shall be the *developed length* of vent piping from the most distant *soil-or-waste pipe* connection to open air. (See Appendix.)

**Table 5.8.B.**  
Forming Part of Sentence 5.8.2.(1)

| Maximum Load Served, <i>fixture units</i> | Size of Vent Pipe, in.         |      |      |      |       |       |       |       |       |
|-------------------------------------------|--------------------------------|------|------|------|-------|-------|-------|-------|-------|
|                                           | 1¼                             | 1½   | 2    | 2½   | 3     | 4     | 5     | 6     | 8     |
|                                           | Maximum Length of Vent Pipe, m |      |      |      |       |       |       |       |       |
| 2                                         | 9.0                            |      |      |      |       |       |       |       |       |
| 8                                         | 9.0                            | 30.0 |      |      |       |       |       |       |       |
| 20                                        | 7.5                            | 15.0 | 46.0 |      |       |       |       |       |       |
| 40                                        | 4.5                            | 9.0  | 30.0 | 91.0 |       |       |       |       |       |
| 60                                        |                                | 4.5  | 15.0 | 24.0 | 120.0 |       |       |       |       |
| 100                                       |                                |      | 9.0  | 21.0 | 55.0  | 215.0 |       |       |       |
| 1,100                                     |                                |      |      | 6.0  | 15.0  | 61.0  | 215.0 |       |       |
| 1,900                                     |                                |      |      |      | 6.0   | 21.0  | 61.0  | 215.0 |       |
| 3,600                                     |                                |      |      |      |       | 7.5   | 18.0  | 76.0  | 245.0 |
| 5,600                                     |                                |      |      |      |       |       | 7.5   | 18.0  | 76.0  |
| Column 1                                  | 2                              | 3    | 4    | 5    | 6     | 7     | 8     | 9     | 10    |

- \* 5.8.3.(1) A *stack vent* or *vent stack* shall be sized in accordance with Table 5.8.C.

Stack vents  
and vent stacks

- \* (2) A *stack vent* acting as a *relief vent* shall be sized as a *stack vent*.
- \* (3) The length of a *stack vent* or a *vent stack* for the purpose of Table 5.8.C, shall be its *developed length* from its lower end to open air. (See Appendix.)

**Table S.8.C.**  
**Forming Part of Sentence S.8.3.(1)**

| Size of Soil-or-Waste Stack, in. | Total Hydraulic Load Served by Vent, fixture units | Size of Stack Vent or Vent Stack, in. |      |      |       |       |       |       |       |       |  |
|----------------------------------|----------------------------------------------------|---------------------------------------|------|------|-------|-------|-------|-------|-------|-------|--|
|                                  |                                                    | 1¼                                    | 1½   | 2    | 2½    | 3     | 4     | 5     | 6     | 8     |  |
|                                  |                                                    | Maximum Length of Vent Pipe, m        |      |      |       |       |       |       |       |       |  |
| 1¼                               | 0-2                                                | 9.0                                   |      |      |       |       |       |       |       |       |  |
| 1½                               | 0-8                                                | 15.0                                  | 46.0 |      |       |       |       |       |       |       |  |
| 2                                | 0-8                                                | 9.0                                   | 23.0 | 61.0 |       |       |       |       |       |       |  |
| 2                                | 9-20                                               | 7.5                                   | 15.0 | 46.0 |       |       |       |       |       |       |  |
| 2                                | 21-24                                              | 4.5                                   | 9.0  | 30.0 |       |       |       |       |       |       |  |
| 2½                               | 0-20                                               |                                       | 14.0 | 46.0 | 120.0 |       |       |       |       |       |  |
| 2½                               | 21-42                                              |                                       | 9.0  | 30.0 | 91.0  |       |       |       |       |       |  |
| 3                                | 0-10                                               |                                       | 9.0  | 30.0 | 61.0  | 185.0 |       |       |       |       |  |
| 3                                | 11-30                                              |                                       | 4.5  | 18.0 | 61.0  | 150.0 |       |       |       |       |  |
| 3                                | 31-60                                              |                                       | 4.5  | 15.0 | 24.0  | 120.0 |       |       |       |       |  |
| 4                                | 0-100                                              |                                       |      | 11.0 | 30.0  | 79.0  | 305.0 |       |       |       |  |
| 4                                | 101-200                                            |                                       |      | 9.0  | 27.0  | 76.0  | 275.0 |       |       |       |  |
| 4                                | 201-500                                            |                                       |      | 6.0  | 21.0  | 55.0  | 215.0 |       |       |       |  |
| 5                                | 0-200                                              |                                       |      |      | 11.0  | 24.0  | 105.0 | 305.0 |       |       |  |
| 5                                | 201-500                                            |                                       |      |      | 9.0   | 21.0  | 91.0  | 275.0 |       |       |  |
| 5                                | 501-1100                                           |                                       |      |      | 6.0   | 15.0  | 61.0  | 215.0 |       |       |  |
| 6                                | 0-350                                              |                                       |      |      | 7.5   | 15.0  | 61.0  | 120.0 | 395.0 |       |  |
| 6                                | 351-620                                            |                                       |      |      | 4.5   | 9.0   | 38.0  | 91.0  | 335.0 |       |  |
| 6                                | 621-960                                            |                                       |      |      |       | 7.5   | 30.0  | 76.0  | 305.0 |       |  |
| 6                                | 961-1900                                           |                                       |      |      |       | 6.0   | 21.0  | 61.0  | 215.0 |       |  |
| 8                                | 0-600                                              |                                       |      |      |       |       | 15.0  | 46.0  | 150.0 | 395.0 |  |
| 8                                | 601-1400                                           |                                       |      |      |       |       | 12.0  | 30.0  | 120.0 | 365.0 |  |
| 8                                | 1401-2200                                          |                                       |      |      |       |       | 9.0   | 27.0  | 105.0 | 335.0 |  |
| 8                                | 2201-3600                                          | NOT PERMITTED                         |      |      |       |       | 7.5   | 18.0  | 76.0  | 245.0 |  |
| 10                               | 0-1000                                             |                                       |      |      |       |       |       | 23.0  | 38.0  | 305.0 |  |
| 10                               | 1001-2500                                          |                                       |      |      |       |       |       | 15.0  | 30.0  | 150.0 |  |
| 10                               | 2501-3300                                          |                                       |      |      |       |       |       | 9.0   | 24.0  | 105.0 |  |
| 10                               | 3301-5600                                          |                                       |      |      |       |       |       | 7.5   | 18.0  | 76.0  |  |
| Column 1                         | 2                                                  | 3                                     | 4    | 5    | 6     | 7     | 8     | 9     | 10    | 11    |  |

## SECTION 6 POTABLE WATER SYSTEMS

### SUBSECTION 6.1 ARRANGEMENT OF PIPING

6.1.1.(1) *Potable water systems* shall be designed, fabricated and installed in accordance with good engineering practice, such as described in the ASHRAE Guide and Data Books, the ASHRAE Handbooks and ASPE Data Books. (See Appendix A.)

(2) Every *fixture* supplied with separate hot and cold water controls shall have the hot water control on the left and the cold on the right.

6.1.2. A *water distribution system* shall be installed so that the system can be drained and, if it is not practicable to avoid a trap or sag in a pipe, provisions shall be made to drain it.

6.1.3.(1) Every *water service pipe* shall be provided with a shut-off valve where the pipe enters the *building*.

(2) Every pipe that is supplied with water from a gravity water tank or a tank of a *private water supply system* shall be provided with a shut-off valve located close to the tank.

\* 6.1.4. Except for a single-family residential *building*, every *riser* shall be provided with a shut-off valve at the source of supply.

6.1.5. Every *water closet* shall be provided with a shut-off valve on its *water supply pipe*.

\* 6.1.6. Except for a single-family residential *building*, shut-off valves shall be installed in every *suite* in a *building* of residential occupancy as defined in the British Columbia Building Code as may be necessary to ensure that when the supply to one *suite* is shut off the supply to the remainder of the *building* is not interrupted.

\* 6.1.7.(1) In *buildings* other than residential *buildings*, shut-off valves shall be provided on the *water supply* to:

(a) every *fixture* or device, or

(b) group of *fixtures* or devices in the same room except as provided in Article 6.1.5.

6.1.8. Every pipe that supplies a hot water tank shall be provided with a shut-off valve located close to the tank.

6.1.9. Every pipe that passes through an exterior wall to supply water to the exterior of the *building* shall be provided with a frost-proof hydrant or a stop-and-waste cock located inside the *building* and close to the wall.

6.1.10. A *check valve* shall be installed at the *building end* of a *water service pipe* where the pipe is made of plastic that is suitable for cold water use only.

6.1.11.(1) Every flushing device that serves a water closet or 1 or more urinals shall have sufficient capacity and be adjusted to deliver at each operation a volume of water that will thoroughly flush the *fixture* or *fixtures* that it serves.

(2) Where a manually operated flushing device is installed it shall serve only one *fixture*.

6.1.12.(1) Every hot water tank shall be equipped with:

(a) a pressure relief valve and a temperature relief valve; or

(b) a combination pressure and temperature relief valve, and

(c) a vacuum relief valve.

\* (2) Except for *service water heaters* that are accepted for use without pressure and/or temperature relief valves, every *service water heater* shall be equipped with such safety devices as recommended by the equipment manufacturer.

\* (3) Pressure relief valves shall be rated to meet the needs of the system and be designed to open when the water pressure in the system reaches the rated working pressure of any part of the system.

Hot and cold faucets

Drainage of piping

Shut-off valve

Valve on risers

Shut-off valves for water closets

Shut-off valves for dwelling units or suites

Shut-off valves for other buildings

Stop-and-waste cocks for exterior supply

Check valves

Flushing devices

Pressure temperature relief valves

- \* (4) Temperature relief valves shall be rated to meet the needs of the system and
  - (a) in a hot water tank, the sensing element shall enter not less than 25 mm of the top 150 mm of the tank to prevent the water exceeding the temperature of 99° C under all operating conditions.
  - (b) in systems other than (a), the sensing element shall be located in the flow of hot water.
- \* (5) Every *pipe* that conveys water from a temperature relief, pressure relief or a combined temperature and pressure relief valve shall:
  - (a) have a *size* at least equal to the *size* of the outlet of the valve,
  - (b) terminate above a floor drain, sump or *fixture* or other *acceptable* safe location,
  - (c) have the discharge *indirectly connected*, and
  - (d) install the relief valve discharge piping so as to drain.
- \* (6) Where the discharge of a relief valve discharges indirectly to an *acceptable* location, the *size* of the piping draining by gravity shall be determined by the anticipated flow of the relief valve.
- \* (7) No shut-off valve or *check valve* shall be installed between a required shut-off valve to a *service water heater* and a relief valve.

Tank pan

- \* (8) A corrosion resistant watertight pan shall be installed under every hot water storage tank that is located other than on the lowest, and on any wooden floor of a building. Such pan shall be larger than the diameter of the tank and the side walls shall be not less than 25 mm high. A pipe, two nominal sizes larger than the relief valve discharge line, shall be securely attached to the bottom of the pan, and the lower end shall terminate in the *storm drainage system* or other *acceptable* location. The tank relief valve line shall terminate directly above the pan drain.

Water hammer

6.1.13. Provision shall be made to protect the *water distribution system* from the adverse effects of water hammer. (See Appendix.)

## SUBSECTION 6.2 PROTECTION FROM CONTAMINATION

Connection of systems

6.2.1.(1) Except as provided in Sentence (2), connections to *potable water systems* shall be designed so that non-potable water, foreign matter, foreign chemicals or substances that may render the water non-potable cannot enter the system.

- \* (2) A water treatment device or apparatus may only be installed with the written permission of the *authority having jurisdiction*.
- \* (3) *Potable water* connections to *fixtures*, tanks, vats or other devices containing other than *potable water* shall be arranged to prevent *back-siphonage*.
- \* (4) *Back-siphonage* shall be prevented by the *acceptable* installation of:
  - (a) an *air gap*,
  - (b) an *atmospheric vacuum breaker*,
  - (c) a *pressure vacuum breaker*,
  - (d) a *double check valve* or
  - (e) a *reduced pressure backflow preventer*.
- \* (5) *Back siphonage* from a *fixture* or device that operates more than 12 h. continuously shall be prevented by the *acceptable* installation of:
  - (a) an *air gap*,

- (b) a *pressure vacuum breaker*.
  - (c) a *double check valve* or
  - (d) a *reduced pressure backflow preventer*.
  - \* (6) *Potable water connections to fixtures, tanks, vats or other devices containing other than potable water and which may be subjected to a pressure in excess of atmospheric shall be arranged to prevent back pressure.*
  - \* (7) *Back pressure of non-toxic substances into a potable water system shall be prevented by the acceptable installation of:*
    - (a) an *air gap*.
    - (b) a *double check valve* or
    - (c) a *reduced pressure backflow preventer*.
  - \* (8) *Back pressure of toxic substances into a potable water system shall be prevented by the acceptable installation of:*
    - (a) an *air gap*.
    - (b) a *reduced pressure backflow preventer*.
  - \* (9) *Back-siphonage and back pressure of non-toxic substances into a potable water system from boilers serving one and two family residences may be prevented by the acceptable installation of a check valve with atmospheric port.*
  - \* (10) *Back-siphonage and back pressure from fire protection systems where water treatment is not added may be prevented by the installation of an acceptable alarm check valve.*
  - (11) *No private water supply system shall be interconnected with a public water supply system.*
  - \* (12) *In addition to any backflow preventer required by this Article, for buildings or facilities where potentially severe health hazard by backflow may occur, the water service pipe shall be provided with premise isolation by an acceptable backflow preventer. (See Appendix.)*
- 6.2.2 A newly installed part of a *potable water system* shall be cleaned before the system is put into operation and, where required, shall be flushed and chlorinated.
- \* 6.2.3.(1) Every *air gap* shall be at least 25 mm in height, and:
- (a) at least twice the diameter of the opening of the water supply outlet in height, or
  - (b) of a design that will preclude the return of water to the *potable water system* when the water level in the *fixture* or device is at its maximum height and a negative pressure of 50 kPa exists in the water supply pipe.
- (2) Tank type water closet valves shall be provided with a *backflow preventer* in conformance with Sentence 2.9.9.(2).
- \* 6.2.4.(1) Where the *critical level* is not marked on an *atmospheric vacuum breaker* or *pressure vacuum breaker*, the *critical level* shall be taken as the lowest point on the device.
- \* (2) Where an *atmospheric vacuum breaker* is installed, it shall be located on the downstream side of the *fixture* control valve or faucet so that it will be subject to water supply pressure only when the valve or faucet is open. (See Appendix.)
- \* (3) An *atmospheric vacuum breaker* shall be installed so that the *critical level* is at least 25 mm above the *flood level rim* of a *fixture* or maximum water level in a tank.
- \* (4) A *pressure vacuum breaker* shall be installed so that the *critical level* is at least 300 mm above the *flood level rim* of a *fixture* or maximum water level in a tank.

Cleaning of systems

Height of air gap

Vacuum breaker

Protection of devices under pressure

- \* **6.2.5** *Backflow preventers* shall be installed in accordance with good engineering practice. (See Appendix.)

### SUBSECTION 6.3 SIZE AND CAPACITY OF PIPES

(See Appendix A.)

- Design \* **6.3.1** Every *water distribution system* shall be designed to conform to Table 6.3.A.
- Hydraulic load \* **6.3.2.(1)** Except as provided in Sentence (2), the hydraulic load of a *fixture* or device that is listed in Table 6.3.A. shall be the number of *fixture units* set forth in the Tables.
- Design \* (2) Where fixtures are supplied with both hot and cold water, the hydraulic loads for maximum separate demands shall be not less than 75% of the hydraulic load of the fixture units given in Table 6.3.A. or 6.3.B. when using the detailed engineering design method.
- Hydraulic load

**Table 6.3.A.**  
Forming Part of Subsection 6.3

| Fixture or Device                      | Minimum<br>Size of<br>Supply Pipe,<br>in. | Min. Flow<br>Pressure, <sup>1</sup><br>kPa (gauge) | Hydraulic Load<br>Fixture Units |        |
|----------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------|--------|
|                                        |                                           |                                                    | Private                         | Public |
| Bathroom group                         |                                           |                                                    |                                 |        |
| (a) with flush tank                    | NA                                        | NA                                                 | 6                               | —      |
| (b) with direct flush valve            | NA                                        | NA                                                 | 8                               | —      |
| Bathtub (with or without<br>shower)    | ½"³                                       | 50                                                 | 2                               | 4      |
| Clothes washer                         | ½                                         | 100                                                | 3                               | —      |
| Dishwasher, domestic                   | ½"³                                       | 100                                                | 3                               | —      |
| Drinking fountain                      | ¾"³                                       | 100                                                | ½                               | 1      |
| Hose bib                               | ½                                         | 100                                                | 2                               | 2      |
| Lavatory                               | ¾"³                                       | 50                                                 | 1                               | 2      |
| Sink                                   |                                           |                                                    |                                 |        |
| (a) kitchen, domestic                  | ½"³                                       | 50                                                 | 2                               | —      |
| (b) kitchen, commercial                | ¾                                         | 50                                                 | —                               | 4      |
| (c) service                            | ½                                         | 50                                                 | —                               | 3      |
| (d) service with direct flush<br>valve | ¾                                         | 100                                                | —                               | 5      |
| Shower head                            | ½                                         | 50                                                 | 2                               | 4      |
| Column 1                               | 2                                         | 3                                                  | 4                               | 5      |

**Table 6.3.A. (Cont'd.)**  
Forming Part of Subsection 6.3

| Fixture or Device           | Minimum<br>Size of<br>Supply Pipe,<br>in. | Min. Flow<br>Pressure, <sup>1</sup><br>kPa (gauge) | Hydraulic Load<br>Fixture Units |        |
|-----------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------|--------|
|                             |                                           |                                                    | Private                         | Public |
| Urinal                      |                                           |                                                    |                                 |        |
| (a) with flush tank         | ½ <sup>2</sup>                            | 50                                                 | —                               | 3      |
| (b) with direct flush valve | ¾                                         | 100                                                | —                               | 5      |
| Water closet                |                                           |                                                    |                                 |        |
| (a) with flush tank         | ¾ <sup>3</sup>                            | 50                                                 | 3                               | 5      |
| (b) with direct flush valve | 1                                         | 100                                                | 6                               | 10     |
| Column 1                    | 2                                         | 3                                                  | 4                               | 5      |

**Notes to Table 6.3.A.:**

<sup>1</sup> Measured immediately upstream of faucet or supply valve.

<sup>2</sup> A continuous load of 0.38L/s.

<sup>3</sup> A tail piece or connector not more than 750 mm in length and not less than 6 mm inside diameter may be used.

- \* (3) The hydraulic load for a *fixture* or device not listed in Table 6.3.A. shall be determined from Table 6.3.B. based on the nominal *size* of the supply fitting or manufacturer's recommendations.

**Table 6.3.B.**  
Forming Part of Sentence 6.3.2.(3)

| Size of Supply Pipe,<br>in. | Hydraulic Load, <i>Fixture Units</i> |        |
|-----------------------------|--------------------------------------|--------|
|                             | Private                              | Public |
| ¼                           | 1                                    | 2      |
| ½                           | 2                                    | 4      |
| ¾                           | 3                                    | 6      |
| 1                           | 6                                    | 10     |
| Column 1                    | 2                                    | 3      |

- \* 6.3.3.(1) Where the static pressure may exceed 585 kPa, a pressure reducing valve shall be installed to limit the maximum static pressure at a fixture to not more than 585 kPa, unless *accepted by the authority having jurisdiction*.

- \* (2) A pressure reducing valve over 1 in. in *size* shall be equipped with:

- (a) gate valves immediately adjacent to the inlet and outlet,
- (b) a valved minimum 1 in. *size* by-pass line,
- (c) a pressure gauge to indicate the reduced pressure,
- (d) the means for ready removal for service or replacement, and
- (e) a strainer with a removable basket.

- \* (3) A pressure reducing valve shall be sized in accordance with the manufacturer's recommendations.

\* 6.3.4.(1) Except for a single family dwelling, every part of a water system shall be sized in accordance with good engineering practice or in accordance with Table 6.3.C. (See Appendix.)

\* (2) Every water service pipe size shall be not less than ¼ inch.

\* Table 6.3.C.  
Forming part of Article 6.3.4.

**FIXTURE UNIT TABLE FOR DETERMINING  
WATER PIPE SIZES FOR WATER SYSTEMS**

| Pressure range — 200 to 310 kPa |                           |                               |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------------------------|---------------------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Water Service                   | Water Distribution System | Maximum allowable length in m |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                                 |                           | 12                            | 18  | 24  | 30  | 46  | 61  | 76  | 91  | 122 | 152 | 183 | 213 | 244 | 274 | 305 |
| ¼                               | ½                         | 6                             | 5   | 4   | 3*  | 2*  | 1*  | 1*  | 1*  | 0*  | 0*  | 0*  | 0*  | 0*  | 0*  | 0*  |
| ¼                               | ¾                         | 18                            | 16  | 14* | 12* | 9*  | 6*  | 5*  | 5*  | 4*  | 4*  | 3*  | 2   | 2   | 2   | 1   |
| ¼                               | 1                         | 29                            | 25  | 23  | 21  | 17  | 15  | 13  | 12  | 10  | 9   | 7   | 6   | 6   | 6   | 6   |
| 1                               | 1                         | 36                            | 31  | 27  | 25  | 20  | 17  | 15  | 13  | 12  | 10  | 8   | 6   | 6   | 6   | 6   |
| 1                               | 1¼                        | 54                            | 47  | 42  | 38  | 32  | 28  | 25  | 23  | 19  | 17  | 14  | 12  | 12  | 11  | 11  |
| 1½                              | 1¼                        | 90                            | 68  | 57  | 48  | 38  | 32  | 28  | 25  | 21  | 18  | 15  | 12  | 12  | 11  | 11  |
| 1½                              | 1½                        | 151                           | 124 | 105 | 91  | 70  | 57  | 49  | 45  | 36  | 31  | 26  | 23  | 21  | 20  | 20  |
| 2                               | 1½                        | 210                           | 162 | 132 | 110 | 80  | 64  | 53  | 46  | 38  | 32  | 27  | 23  | 21  | 20  | 20  |
| 1½                              | 2                         | 220                           | 205 | 190 | 176 | 155 | 138 | 127 | 120 | 104 | 85  | 70  | 61  | 57  | 54  | 51  |
| 2                               | 2                         | 372                           | 329 | 292 | 265 | 217 | 185 | 164 | 147 | 124 | 96  | 70  | 61  | 57  | 54  | 51  |
| 2                               | 2½                        | 445                           | 418 | 390 | 370 | 330 | 300 | 280 | 265 | 240 | 220 | 198 | 175 | 158 | 143 | 133 |
| Pressure range — 311 to 413 kPa |                           |                               |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| ¼                               | ½                         | 0                             | 7*  | 6*  | 5*  | 4*  | 3*  | 2*  | 2*  | 1*  | 1*  | 1*  | 0*  | 0*  | 0*  | 0*  |
| ¼                               | ¾                         | 27                            | 23  | 19  | 17  | 14* | 11* | 9*  | 8*  | 6*  | 5*  | 4*  | 4*  | 3*  | 3*  | 3*  |
| ¼                               | 1                         | 44                            | 40  | 36  | 33  | 28  | 23  | 21  | 19  | 17  | 14  | 12  | 10  | 9   | 8   | 8   |
| 1                               | 1                         | 60                            | 47  | 41  | 36  | 30  | 25  | 23  | 20  | 18  | 15  | 12  | 10  | 9   | 8   | 8   |
| 1                               | 1¼                        | 102                           | 87  | 76  | 67  | 52  | 44  | 39  | 36  | 30  | 27  | 22  | 20  | 19  | 17  | 16  |
| 1½                              | 1¼                        | 156                           | 130 | 106 | 89  | 66  | 52  | 44  | 39  | 33  | 29  | 24  | 20  | 19  | 17  | 16  |
| 1½                              | 1½                        | 270                           | 225 | 193 | 167 | 128 | 105 | 90  | 78  | 62  | 52  | 42  | 38  | 35  | 32  | 30  |
| 2                               | 1½                        | 286                           | 286 | 242 | 204 | 150 | 117 | 98  | 84  | 67  | 55  | 42  | 38  | 35  | 32  | 30  |
| 1½                              | 2                         | 360                           | 360 | 340 | 318 | 272 | 240 | 220 | 198 | 170 | 150 | 135 | 123 | 110 | 102 | 94  |
| 2                               | 2                         | 570                           | 510 | 470 | 430 | 368 | 318 | 280 | 250 | 205 | 165 | 142 | 123 | 110 | 102 | 94  |
| 2                               | 2½                        | 680                           | 640 | 610 | 580 | 535 | 500 | 470 | 440 | 400 | 365 | 335 | 315 | 285 | 267 | 250 |
| Pressure range — over 413 kPa   |                           |                               |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| ¼                               | ½                         | 11                            | 9   | 7*  | 6*  | 5*  | 4*  | 3*  | 3*  | 2*  | 1*  | 1*  | 1*  | 1*  | 1*  | 0*  |
| ¼                               | ¾                         | 31                            | 28  | 24  | 22  | 17  | 13* | 11* | 10* | 8*  | 7*  | 6*  | 6*  | 5*  | 4*  | 4*  |
| ¼                               | 1                         | 63                            | 53  | 47  | 42  | 35  | 30  | 27  | 24  | 21  | 17  | 14  | 13  | 12  | 12  | 11  |
| 1                               | 1                         | 72                            | 66  | 55  | 48  | 38  | 32  | 29  | 26  | 22  | 18  | 14  | 13  | 12  | 12  | 11  |
| 1                               | 1¼                        | 140                           | 126 | 108 | 96  | 74  | 62  | 53  | 47  | 39  | 31  | 26  | 25  | 23  | 22  | 21  |
| 1½                              | 1¼                        | 156                           | 156 | 150 | 127 | 93  | 74  | 62  | 54  | 43  | 34  | 26  | 25  | 23  | 22  | 21  |
| 1½                              | 1½                        | 286                           | 286 | 273 | 240 | 186 | 154 | 130 | 113 | 88  | 73  | 51  | 51  | 46  | 43  | 40  |
| 2                               | 1½                        | 286                           | 286 | 286 | 275 | 220 | 170 | 142 | 122 | 98  | 82  | 64  | 51  | 46  | 43  | 40  |
| 1½                              | 2                         | 360                           | 360 | 360 | 360 | 335 | 305 | 282 | 244 | 212 | 187 | 172 | 153 | 141 | 129 |     |
| 2                               | 2                         | 611                           | 611 | 610 | 560 | 478 | 420 | 375 | 340 | 288 | 245 | 204 | 172 | 153 | 141 | 129 |
| 2                               | 2½                        | 690                           | 690 | 690 | 690 | 690 | 650 | 610 | 570 | 510 | 460 | 430 | 404 | 380 | 356 | 329 |

\* Branch pipes up to 7 metres developed length (from main to outlet or fixture) may supply maximum of four fixture units for ½ in. size and maximum 16 fixture units for ¼ in. nominal size.

## SECTION 7 NON-POTABLE WATER SYSTEMS

### SUBSECTION 7.1 CONNECTION

**7.1.1** A *non-potable water system* shall not be connected to a *potable water system*.

### SUBSECTION 7.2 IDENTIFICATION

**7.2.1** *Non-potable* water piping shall be identified by markings that are permanent, distinct and easily recognized.

### SUBSECTION 7.3 LOCATION

**7.3.1.(1)** *Non-potable* water piping shall not be located:

Location of  
pipe

- (a) where food is prepared in a food processing plant.
- (b) above food-handling equipment,
- (c) above a non-pressurized *potable* water tank, or
- (d) above a cover of a pressurized *potable* water tank.

\* **7.3.2.(1)** Unless *accepted* by an outlet from a *non-potable water system* shall not be located where it can discharge into:

Location of  
outlets

- (a) a sink or lavatory,
- (b) a *fixture* into which an outlet from a *potable water system* is discharged, or
- (c) a *fixture* that is used for a purpose related to the preparation, handling or dispensing of food, drink or products that are intended for human consumption.



## **APPENDIX A**

# **EXPLANATORY MATERIAL for the British Columbia Plumbing Code 1985**

(This Appendix contains notes, explanations and diagrams that apply to the requirements of this Code. The bold-face reference numbers that introduce each item apply to the requirements in the main body of the Code to which the explanatory material is applicable. The bold-face captions following these reference numbers describe the subjects to which the references apply.)

### SYMBOLS AND ABBREVIATIONS

The following symbols and abbreviations have been used in the diagrams:

Water and drainage pipe \_\_\_\_\_

Subsoil drains . . . .

Vent pipe -----

BG Bathroom group

KS Kitchen sink

BT Bathtub

LAV Lavatory

CO Cleanout

LT Laundry tray

DF Drinking fountain

RD roof drain

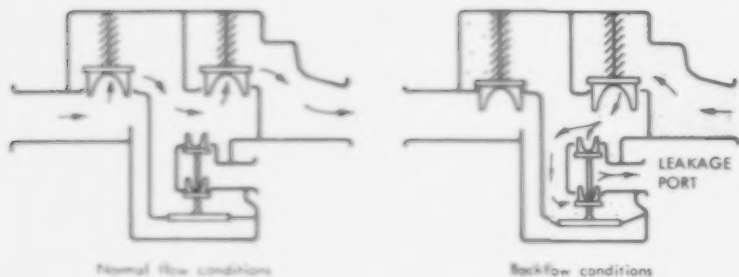
FD Floor drain

UR Urinals

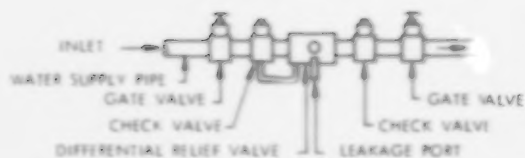
FS Floor sink

WC Water closet

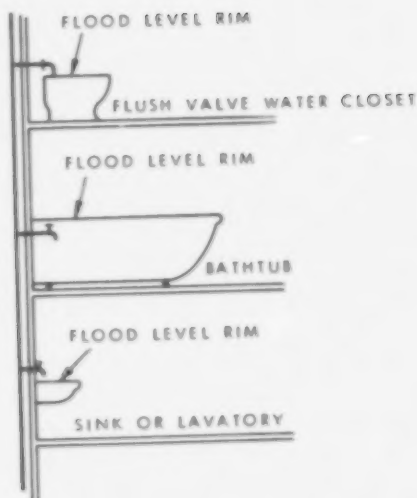
# Definition for Backflow preventer



(a) Reduced pressure backflow preventer

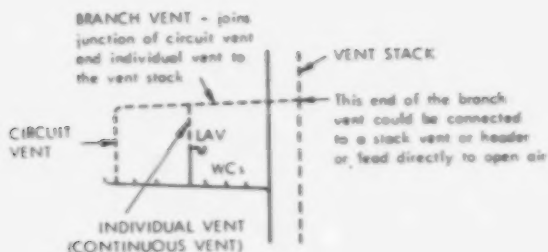


(b) Assembly of differential valves and check valves used as a backflow preventer

**Definition for *Back-siphonage***

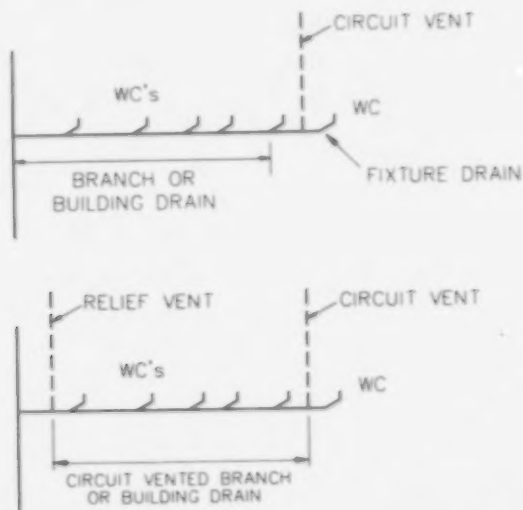
This diagram shows a situation that is fairly common in old buildings. If the bathtub is filled to a level above the faucet outlet, or if the flush valve of the water closet is faulty, and if the faucet at the sink or lavatory on the lower floor is opened, water can be drawn (siphoned) from the bathtub or the water closet into the water system when the pressure in the water system is low or the water supply has been shut off.

### Definition for *Branch vent*



(See also explanations for definitions for header and drainage system.)

### Definition for *Circuit vent*



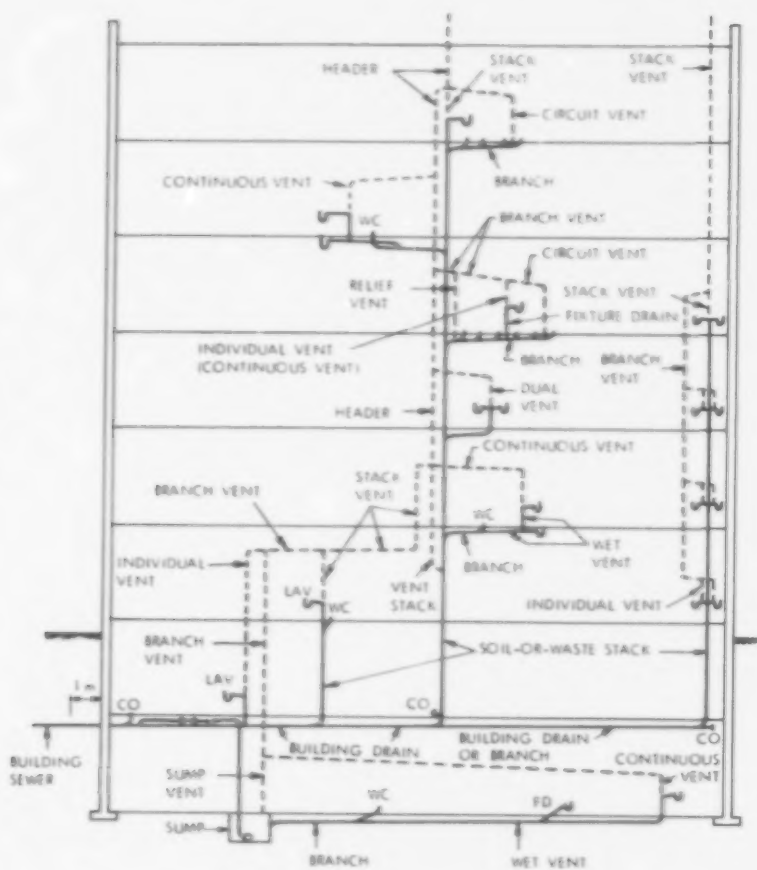
A circuit vented branch or building drain must consist of a circuit vent and a relief vent.

(See also explanation for definition for *drainage system*.)

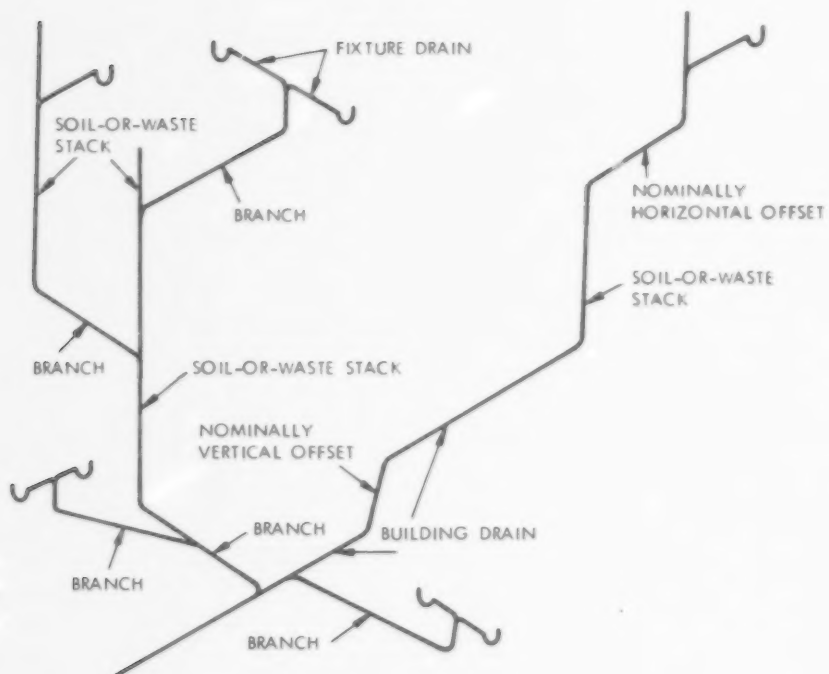
### Definition for *Clear-water waste*

Examples of clear-water waste are the waste waters discharged from a drinking fountain, cooling jacket, air conditioner or relief valve outlet.

# Definition for Drainage system DRAINAGE AND VENTING SYSTEMS

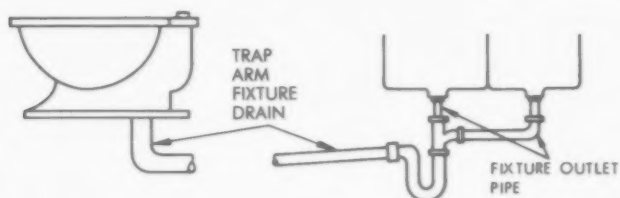


**Definition for Drainage system (Cont'd.)** **PARTIAL DRAINAGE SYSTEM**  
**(ISOMETRIC VIEW IGNORING VENTS)**

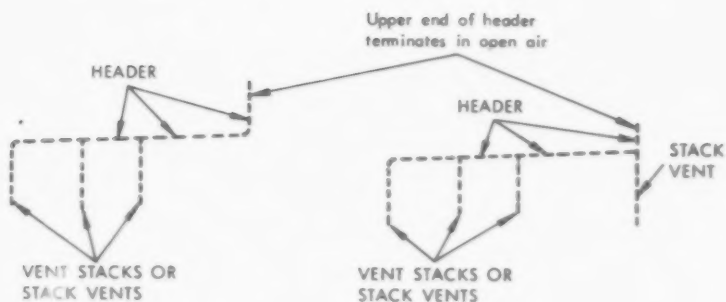


Partial Drainage System  
(Isometric View)

### Definitions for *Fixture drain* and *Fixture outlet pipe*

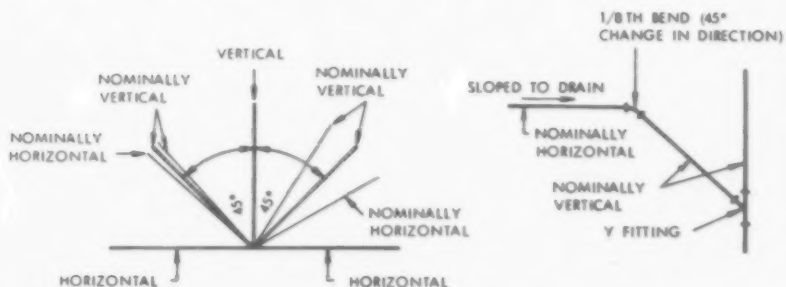


### Definition for *Header*

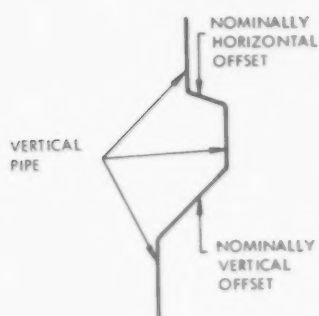


Although a header is similar to a branch vent, it serves the special purpose of connecting the tops of stack vents or vent stacks. To make certain that it is adequate for that purpose it is made larger than a branch vent. The developed length used to determine its size is the total length from the most distant soil-or-waste pipe to open air, rather than the shorter length used to size a branch vent.

### Definitions for *Nominally horizontal* and *Nominally vertical*



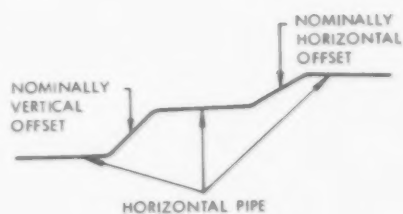
## Definition for *Offset*



(a) Elevation view of vertical pipe

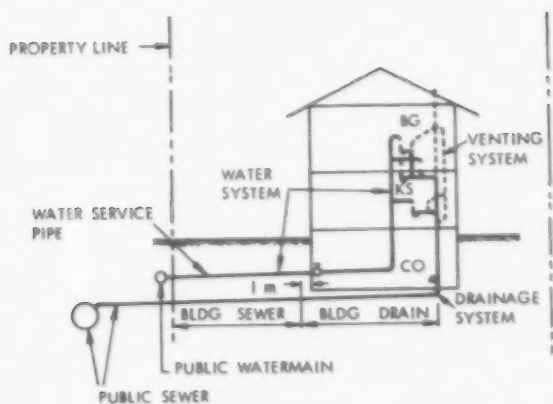


(b) Plan view of horizontal pipe

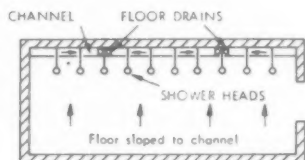


(c) Elevation view of horizontal pipe

## Definition for *Plumbing system*

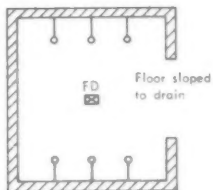


### Sentence 2.2.3.(3) SHOWER DRAINAGE PLAN VIEW



(a) Permitted

\* Minimum distance between shower heads = 750 mm

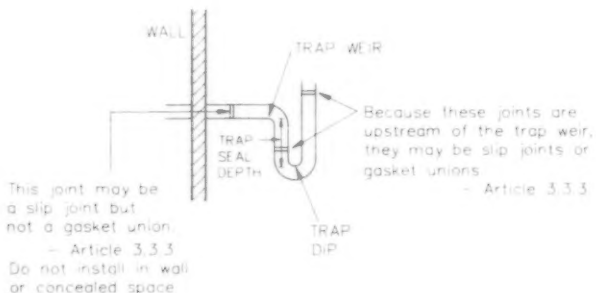


(b) Not permitted

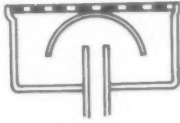
### Article 2.2.4.

This does not preclude the use of a standing waste.

### Sentence 2.3.1.(1) and 2.3.1.(2) TRAP SEAL DEPTH AND TRAP CONNECTIONS



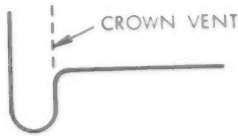
### Sentence 2.3.1.(3) PROHIBITED TRAPS



(a) Bell trap



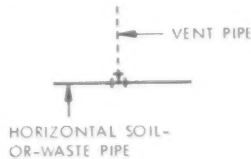
(b) S trap



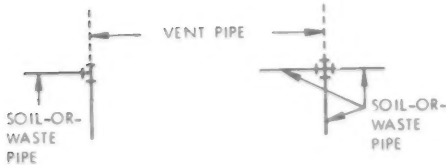
(c) Crown vented trap

Except for an S-trap standard, the S trap shown in diagram (b) above is prohibited by Clause 5.1.1.(2)(c) which limits the fall on fixture drains. Crown vented traps shown in diagram (c) are prohibited by Clause 5.6.3.(1)(a) which requires that the distance from the trap weir to the vent be not less than twice the size of the fixture drain.

### Article 2.4.1. T FITTINGS IN DRAINAGE SYSTEMS



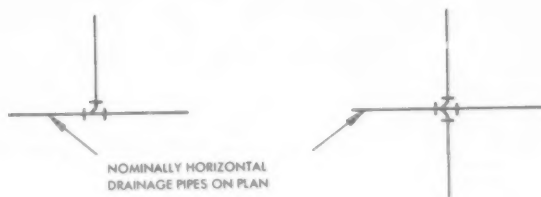
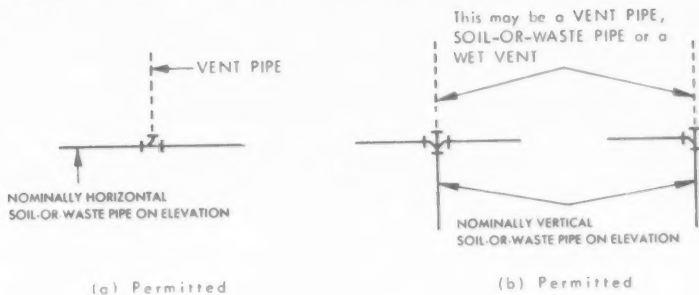
(a) Permitted



(b) Not Permitted

This prohibits the use of a cross fitting in a drainage system, but such fitting may be used in a venting system to connect 4 vent pipes. In a drainage system a T fitting can only be used as shown in diagram (a), and cannot be used as shown in diagram (b) because the T or cross fitting would change the direction of flow in the drainage system.

## Article 2.4.2. SANITARY T FITTINGS IN DRAINAGE SYSTEMS



(c) Not Permitted (Use Combination Y and 1/8th bend)

A Sanitary T fitting may be used to change the direction of flow in a drainage system from horizontal to vertical, but may not be used to change the direction of flow in a nominally horizontal drainage system. A combination Y and  $\frac{1}{8}$ th bend fitting may also be used as shown in Figure (b).

## A-2.5, A-2.6 and A-2.7

## SUMMARY OF PIPE AND FITTINGS APPLICATIONS

| Type of Piping                                                                                                                                                  | Standard References                            | Code References        | Use of Piping <sup>(1)</sup> |                                        |                |                |              |                                   |                                   |                       |                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------|------------------------------|----------------------------------------|----------------|----------------|--------------|-----------------------------------|-----------------------------------|-----------------------|-----------------------|
|                                                                                                                                                                 |                                                |                        | Drainage System              |                                        |                | Venting System |              | Potable Water System              |                                   |                       |                       |
|                                                                                                                                                                 |                                                |                        | Above ground inside building | Under-ground under building            | Building Sewer | Above ground   | Under-ground | Above ground                      |                                   | Underground           |                       |
|                                                                                                                                                                 |                                                |                        |                              |                                        |                |                |              | Cold                              | Hot                               | Under building        | Outside building      |
| Asbestos-cement DWV pipe<br>Type I Class 3000, sizes 8" to 24"<br>Type II Class 4000, sizes 3" to 24"                                                           | CGSB 34-GP-22M, or CSA B127.1                  | 2.5.1.(1)<br>2.5.1.(1) | P<br>P                       | P<br>P                                 | P<br>P         | P<br>P         | P<br>P       | N<br>N                            | N<br>N                            | N<br>N                | N<br>N                |
| Asbestos-cement sewer pipe (non-pressure)<br>Classes 1500, 2400, 3000, sizes 4", 5", 6"<br>Classes 1500, 2400, 3300, 4000, 5000, 6000, 7000, sizes 8" to 42, 2" | CGSB 34-GP-23M, or CSA B127.2<br>CGSB 34-GP-9M | 2.5.1.(2)<br>2.5.1.(2) | N<br>N                       | P<br>P                                 | P<br>P         | N<br>N         | P<br>P       | N<br>N                            | N<br>N                            | N<br>N                | N<br>N                |
| Asbestos-cement water pipe<br>Class 100 psi<br>Class 150 psi<br>Class 200 psi                                                                                   | CGSB 34-GP-1M                                  | 2.5.2                  | N                            | N                                      | N              | N              | N            | N                                 | N                                 | p <sup>(2)</sup>      | p <sup>(2)</sup>      |
| Concrete sewer pipe<br>Sewer, storm drain and culvert<br>Reinforced culvert, storm drain and sewer                                                              | CSA Series A257<br>CSA A257.1<br>CSA A257.2    | 2.5.3<br>2.5.3         | N<br>N                       | p <sup>(12)</sup><br>p <sup>(12)</sup> | P<br>P         | N<br>N         | N<br>N       | N<br>N                            | N<br>N                            | N<br>N                | N<br>N                |
| Vitrified clay pipe                                                                                                                                             | CSA A60.1                                      | 2.5.4                  | N                            | P                                      | P              | N              | P            | N                                 | N                                 | N                     | N                     |
| Polyethylene water pipe<br>Series 160 tube sizes with compression fittings<br>Series 50, 75, 100 and 125                                                        | CSA B137.1                                     | 2.5.5<br>2.5.5         | N<br>N                       | N<br>N                                 | N<br>N         | N<br>N         | N<br>N       | N<br>N                            | N<br>N                            | p <sup>(3)</sup><br>N | p <sup>(3)</sup><br>N |
| Poly (vinyl chloride) (PVC) water pipe<br>Series 80, 100, 125, 160 and 200                                                                                      | CSA B137.3                                     | 2.5.6                  | N                            | N                                      | N              | N              | N            | P                                 | N                                 | p <sup>(4)</sup>      | p <sup>(4)</sup>      |
| Chlorinated poly (vinyl chloride) (CPVC) water pipe                                                                                                             | CSA B137.6                                     | 2.5.7                  | N                            | N                                      | N              | N              | N            | p <sup>(5) ps<sup>(6)</sup></sup> | p <sup>(5) ps<sup>(6)</sup></sup> | p <sup>(7)</sup>      | p <sup>(7)</sup>      |
| Polybutylene water pipe                                                                                                                                         | CSA B137.8                                     | 2.5.8                  | N                            | N                                      | N              | N              | N            | p <sup>(5) ps<sup>(6)</sup></sup> | p <sup>(5) ps<sup>(6)</sup></sup> | P                     | P                     |
| Plastic sewer pipe                                                                                                                                              | CSA B182.1                                     | 2.5.9.(1)              | N                            | N                                      | P              | N              | N            | N                                 | N                                 | N                     | N                     |
| Column 1                                                                                                                                                        | 2                                              | 3                      | 4                            | 5                                      | 6              | 7              | 8            | 9                                 | 10                                | 11                    | 12                    |

## A-2.5, A-2.6 and A-2.7 (Cont'd)

| SUMMARY OF PIPE AND FITTINGS APPLICATIONS     |                                                                                                         |                    |                                       |                                       |                   |                     |                  |                      |                  |                   |                     |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------|---------------------------------------|-------------------|---------------------|------------------|----------------------|------------------|-------------------|---------------------|
| Type of<br>Piping                             | Standard<br>References                                                                                  | Code<br>References | Use of Piping <sup>(1)</sup>          |                                       |                   |                     |                  |                      |                  |                   |                     |
|                                               |                                                                                                         |                    | Drainage System                       |                                       |                   | Venting System      |                  | Potable Water System |                  |                   |                     |
|                                               |                                                                                                         |                    | Above<br>ground<br>inside<br>building | Under-<br>ground<br>under<br>building | Building<br>Sewer | Above<br>ground     | Under-<br>ground | Above ground         |                  | Underground       |                     |
|                                               |                                                                                                         |                    |                                       |                                       |                   |                     |                  | Cold                 | Hot              | Under<br>building | Outside<br>building |
| Acrylonitrile-butadiene-<br>styrene (ABS) DMV | CSA B181.1                                                                                              | 2.5.9,<br>2.5.10   | P <sup>(5)(6)</sup>                   | P                                     | P                 | P <sup>(5)(6)</sup> | P                | N                    | N                | N                 | N                   |
| Poly (vinyl chloride)(PVC)<br>DWV pipe        | CSA B181.2                                                                                              | 2.5.9,<br>2.5.10   | P <sup>(5)(6)</sup>                   | P                                     | P                 | P <sup>(5)(6)</sup> | P                | N                    | N                | N                 | N                   |
| Cast-iron soil pipe                           | CSA B70                                                                                                 | 2.6.1.             | P                                     | P                                     | P                 | P                   | P                | N                    | N                | N                 | N                   |
| Cast-iron water pipe                          | ANSI/<br>AWWA<br>C106/A21.6<br>(Gray Iron),<br>or ANSI/<br>AWWA<br>C151/<br>A21.51<br>(Ductile<br>Iron) | 2.6.4.             | P                                     | P                                     | P                 | P                   | P                | P                    | P                | P                 | P                   |
| Cast-iron screwed fittings                    | ANSI B16.4<br>(Cast iron)                                                                               | 2.6.5.             | N                                     | N                                     | N                 | N                   | N                | P                    | P                | P                 | P                   |
|                                               | ANSI B16.3<br>(Malleable<br>Iron)                                                                       | 2.6.6.             |                                       |                                       |                   |                     |                  |                      |                  |                   |                     |
| Welded and seamless steel<br>galvanized pipe  | ASTM A53                                                                                                | 2.6.7.             | P                                     | N                                     | N                 | P                   | N                | P <sup>(3)</sup>     | P <sup>(3)</sup> | P <sup>(3)</sup>  | P <sup>(3)</sup>    |
| Corrugated steel galvanized<br>pipe           | CAN3-G401                                                                                               | 2.6.8.             | N                                     | N                                     | P <sup>(3)</sup>  | N                   | N                | N                    | N                | N                 | N                   |
| Sheet metal pipe <sup>10</sup>                | —                                                                                                       | 2.6.9.             | N                                     | N                                     | N                 | N                   | N                | N                    | N                | N                 | N                   |
| Copper and brass pipe                         | ASTM B42<br>(copper)                                                                                    | 2.7.1.             | P                                     | P                                     | P                 | P                   | P                | P                    | P                | P                 | P                   |
|                                               | ASTM B43<br>(red brass)                                                                                 | 2.7.1.             |                                       |                                       |                   |                     |                  |                      |                  |                   |                     |
|                                               | ANSI<br>B16.24                                                                                          | 2.7.2.             |                                       |                                       |                   |                     |                  |                      |                  |                   |                     |
| Brass or bronze threaded<br>water fittings    | ANSI<br>B16.15                                                                                          | 2.7.3.             | N                                     | N                                     | N                 | N                   | N                | P                    | P                | P                 | P                   |
| Copper tube Types K and L<br>hard             | ASTM B88                                                                                                | 2.7.4.             | P                                     | P                                     | P                 | P                   | P                | P                    | P                | N                 | N                   |
| Types K and L soft                            | ASTM B88                                                                                                | 2.7.4.             | N                                     | N                                     | N                 | N                   | N                | P                    | P                | P                 | P                   |
| Type M hard                                   | ASTM B88                                                                                                | 2.7.4.             | P                                     | N                                     | N                 | P                   | N                | N                    | N                | N                 | N                   |
| Type M soft                                   | ASTM B88                                                                                                | 2.7.4.             | N                                     | N                                     | N                 | N                   | N                | N                    | N                | N                 | N                   |
| Type DWV                                      | ASTM B306                                                                                               | 2.7.4.             | P <sup>(11)</sup>                     | N                                     | N                 | P <sup>(11)</sup>   | N                | N                    | N                | N                 | N                   |
| Column 1                                      | 2                                                                                                       | 3                  | 4                                     | 5                                     | 6                 | 7                   | 8                | 9                    | 10               | 11                | 12                  |

## A-2.5, A-2.6 and A-2.7 (Cont'd)

| SUMMARY OF PIPE AND FITTINGS APPLICATIONS |                            |                 |                              |                             |                |                |              |                      |     |                |                  |
|-------------------------------------------|----------------------------|-----------------|------------------------------|-----------------------------|----------------|----------------|--------------|----------------------|-----|----------------|------------------|
| Type of Piping                            | Standard References        | Code References | Use of Piping <sup>(1)</sup> |                             |                |                |              |                      |     |                |                  |
|                                           |                            |                 | Drainage System              |                             |                | Venting System |              | Potable Water System |     |                |                  |
|                                           |                            |                 | Above ground inside building | Under ground under building | Building Sewer | Above ground   | Under-ground | Above ground         |     | Underground    |                  |
|                                           |                            |                 |                              |                             |                |                |              | Cold                 | Hot | Under building | Outside building |
| Solder-joint drainage fittings            | CSA B158.1<br>ANSI B16.29  | 2.7.5.          | P                            | P                           | P              | P              | P            | N                    | N   | N              | N                |
| Solder-joint water fittings               | ANSI B16.18<br>ANSI B16.22 | 2.7.6.          | N                            | N                           | N              | P              | P            | P                    | P   | P              | P                |
| Lead waste pipe                           | CSA B67                    | 2.7.8.          | permitted                    | P                           | N              | permitted      | P            | N                    | N   | N              | 27               |
| Aluminum DWV pipe                         | CSA CAN 3-B281             | 2.7.9.(1)       | P                            | P                           | P              | P              | P            | N                    | N   | N              | N                |
| Column 1                                  | 2                          | 3               | 4                            | 5                           | 6              | 7              | 8            | 9                    | 10  | 11             | 12               |

## Notes to Table:

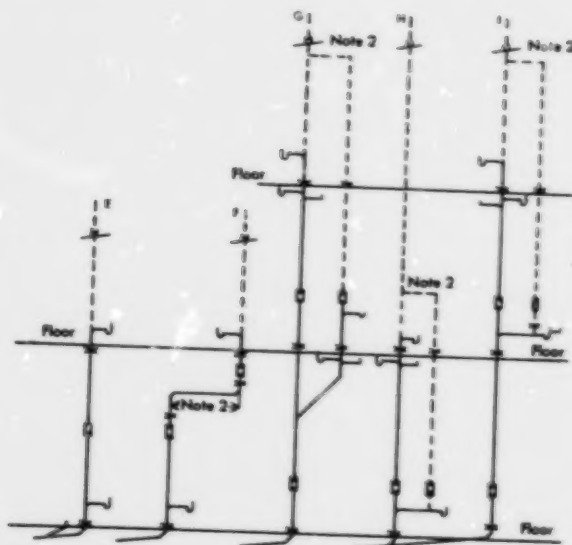
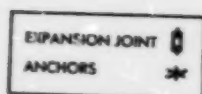
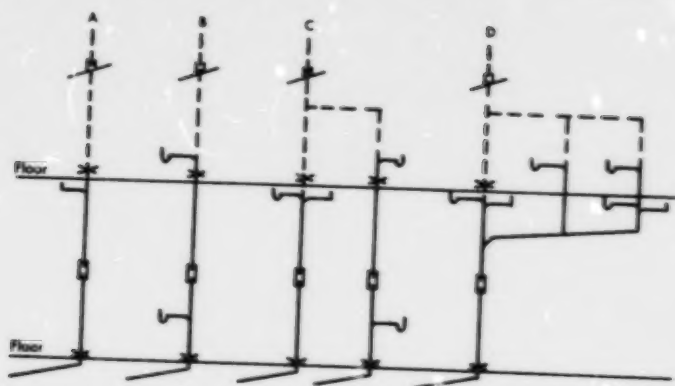
N — Not permitted. P — Permitted

<sup>(1)</sup> Where fire stops are pierced by pipes, the integrity of the fire stop must be maintained.<sup>(2)</sup> Cold water only.<sup>(3)</sup> Permitted only for water service pipe.<sup>(4)</sup> Not permitted in hot water systems.<sup>(5)</sup> Requirements for combustible piping in relation to fire safety shall conform to Sentence 3.1.4.5.(5) and Sentence 3.1.7.3.(1) to Sentence 3.1.7.3.(4) of Part 3 and Articles 9.10.9.10 and 9.10.9.26 to 9.10.9.29, of Part 9 of the British Columbia Building Code 1985.<sup>(6)</sup> Where noncombustible piping pierces a fire separation or a fire-stop, the requirements for fire stopping of Subsection 3.1.9. of Part 3 and Articles 9.10.9.9. and 9.10.15.10. of Part 9 of the British Columbia Building Code 1985 shall apply.<sup>(7)</sup> Not to exceed design temperature and design pressure in Sentence 2.5.7.(2).<sup>(8)</sup> Permitted only in buildings of industrial occupancy as described in the National Building Code 1985, or the repair of existing galvanized steel piping systems.<sup>(9)</sup> Permitted underground only in a storm drainage system.<sup>(10)</sup> Permitted only for an external leader.<sup>(11)</sup> Not permitted for the fixture drain or vent below the flood level rim of a flush valve operated urinal.<sup>(12)</sup> Gasketed joints required.

## Sentence 2.8.3.(2) JOINTING MATERIALS

| RATED INTERNAL WORKING PRESSURES OF JOINTS WITH COPPER TUBE AND SOLDER-JOINT FITTINGS (KILOPASCALS) |                               |                                                |               |               |              |                |
|-----------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------|---------------|---------------|--------------|----------------|
| Solder or Brazing Alloy Used in Joints                                                              | Service Temperature Degrees C | Copper Water Tube K & L Nominal Sizes (inches) |               |               |              |                |
|                                                                                                     |                               | Water                                          |               |               |              |                |
|                                                                                                     |                               | ¼ to 1 Incl.                                   | 1¼ to 2 Incl. | 2½ to 4 Incl. | 5 to 8 Incl. | 10 to 12 Incl. |
| 50-50 Tin-Lead                                                                                      | 38                            | 1379                                           | 1206          | 1034          | 896          | 689            |
|                                                                                                     | 66                            | 1034                                           | 861           | 689           | 620          | 482            |
|                                                                                                     | 93                            | 689                                            | 620           | 517           | 482          | 345            |
|                                                                                                     | 121                           | 586                                            | 517           | 345           | 345          | 276            |
| 95-5                                                                                                | 38                            | 3445                                           | 2756          | 2067          | 1034         | 1034           |
|                                                                                                     | 66                            | 2756                                           | 2412          | 1895          | 1034         | 1034           |
|                                                                                                     | 93                            | 2067                                           | 1723          | 1379          | 1034         | 965            |
|                                                                                                     | 121                           | 1379                                           | 1206          | 1034          | 965          | 758            |

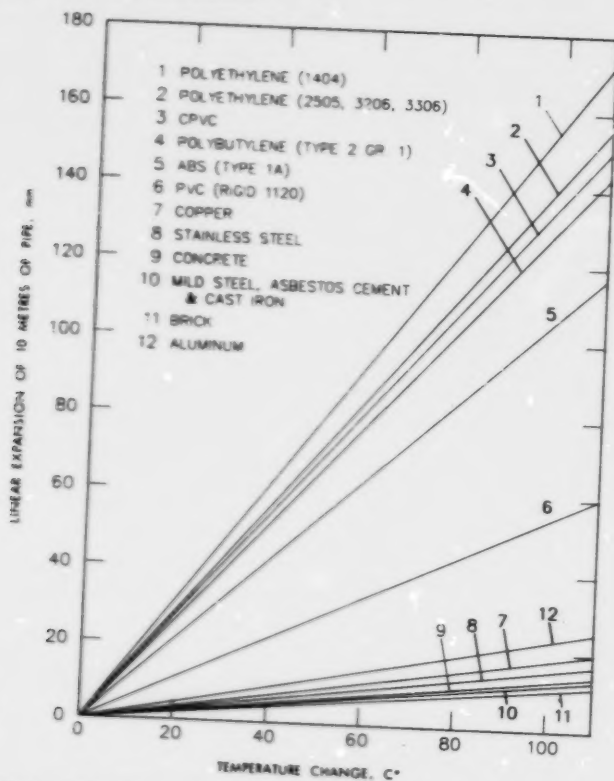
### Article 3.3.9. EXPANSION JOINTS



**TYPICAL INSTALLATIONS SHOWING WHERE EXPANSION JOINTS AND ANCHORS ARE REQUIRED WITH PLASTIC D.W.V. PIPING**

- 1 Expansion joints are required to be accessible.
- 2 Where a horizontal offset of more than 1.2 m for 2 in. pipe or less and of more than 2.6 m for sizes more than 2 in. is built into the waste or vent piping and providing the minimum grade is increased, the expansion joint and the anchor below the offset may be dispensed with.
- 3 Expansion joints to be installed with centre mark at the top of the sleeve.

### Article 3.3.9. LINEAR EXPANSION



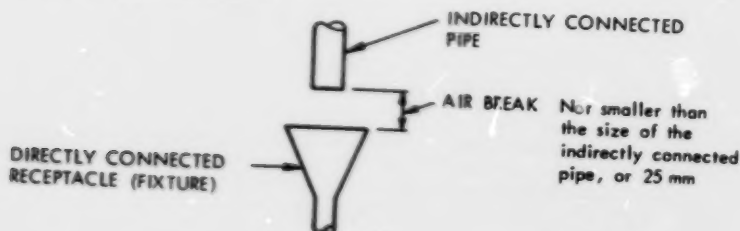
Example: To determine the expansion of 20 m of ABS pipe for a temperature change from 10°C to 60°C.

—Temperature change =  $60 - 10 = 50^\circ\text{C}$

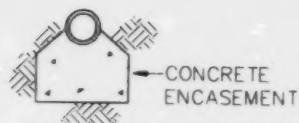
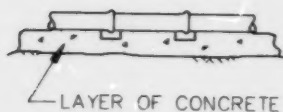
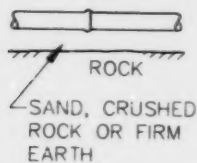
—Enter the chart at  $50^\circ\text{C}$ , read up to ABS line, and then across to the mm scale = 53 mm/10 m of pipe.

— $\therefore$  change in length of 20 m of pipe =  $\frac{20}{10} \times 53 = 106 \text{ mm}$ .

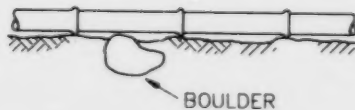
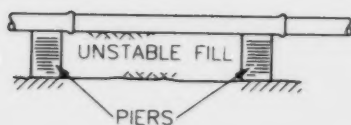
### Sentence 3.3.11.(2) AIR BREAK



### Article 3.4.6. SUPPORT FOR UNDERGROUND PIPING



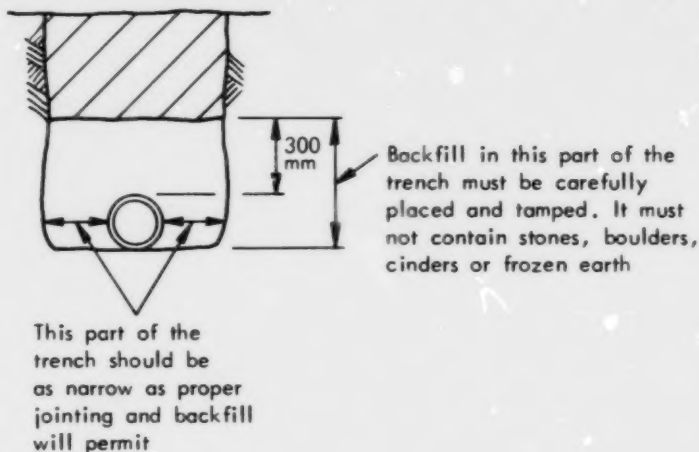
(a) Permitted



(b) Not permitted

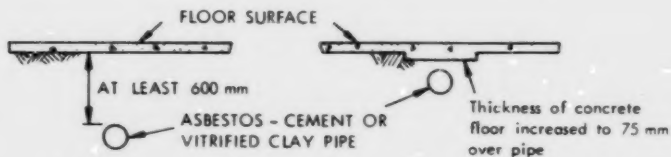
See explanation for Subsection 3.5 for additional protection required for underground pipes. Permitted installations are shown in diagram (a). The methods of support shown in diagram (b) are not permitted because the base does not provide firm and continuous support for the pipe.

### Article 3.5.1. BACKFILLING OF PIPE TRENCH



Stronger pipes may be required in deep fill or under driveways, parking lots, etc., and compaction for the full depth of the trench may be necessary.

### Article 3.5.2. PROTECTION OF UNDERGROUND NON-METALLIC PIPES

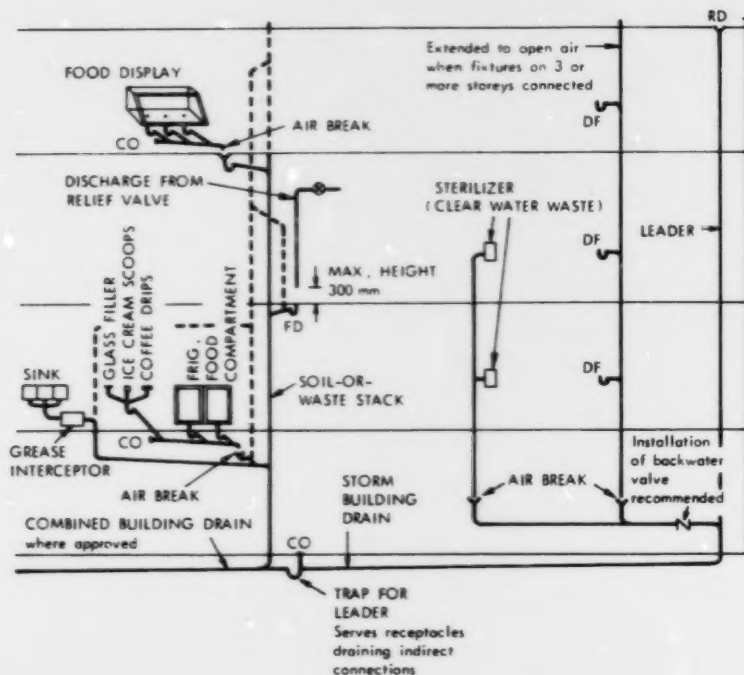


(a) Concrete floors less than 75 mm thick



(b) Concrete floor 75 mm or more in thickness  
(no protection required)

# **Clauses 4.2.1.(1)(a) and (d) INDIRECT CONNECTIONS**

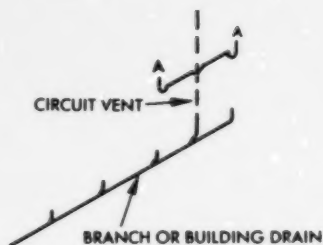


See Sentence 4.5.1.(4) for trapping requirements for indirectly connected fixtures.

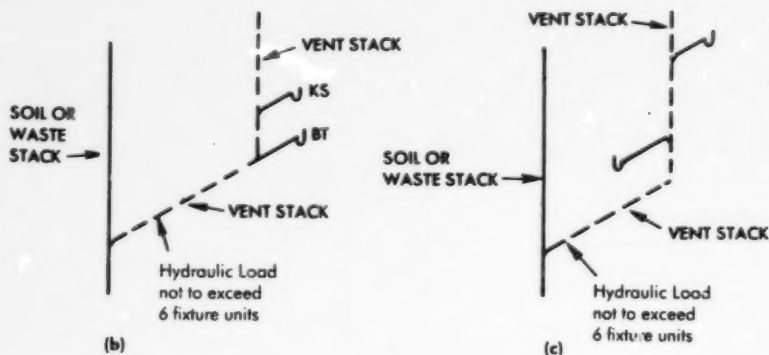
See Sentence 4.7.1.(8) for cleanouts on drip pipes for food receptacles or display cases.

# Clauses 4.2(1)(e), (f) and (g) FIXTURE CONNECTIONS TO VENT PIPES

## FIXTURE CONNECTIONS TO VENT PIPES



(a) 4.2.1.(e)

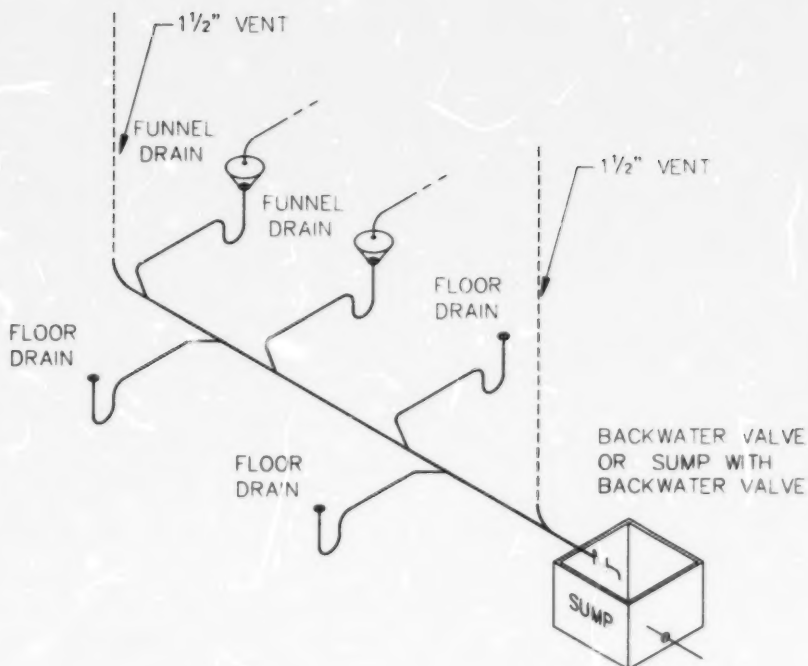


4.2.1.(g)

When 1 or more fixture drains are connected to a vent pipe, the vent pipe becomes a wet vent. It must then conform to all the requirements that can apply to it as a drainage pipe and a vent pipe.

See Appendix material on Sentences 5.3.1. (1), (2) and (3) for further information regarding Clause 4.2.1.(1)(e).

**4.2.1.(1)(h) CONNECTION TO A SANITARY DRAINAGE SYSTEM LOCATED IN FOOD PREPARATION, DISPLAY, OR STORAGE AREAS**



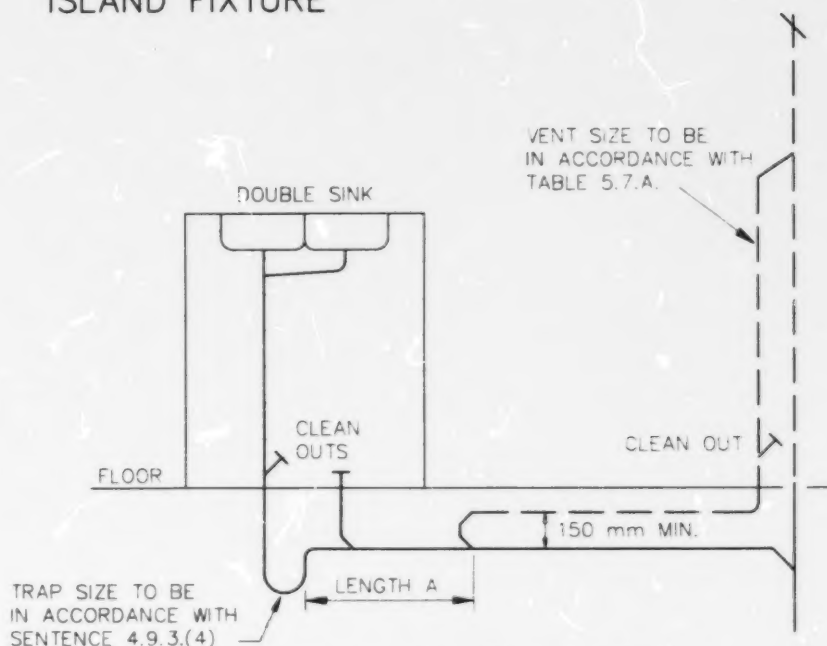
**NOTE:**  
 Sump vent omitted  
 for clarity.  
 Refer to 4.6.3.(2),  
 5.7.6.(1)  
 and (2)

The following fixtures  
 are not permitted to  
 discharge into a sump:

- (1) URINALS
- (2) WATER CLOSETS
- (3) FOOD WASTE DISPOSAL UNITS

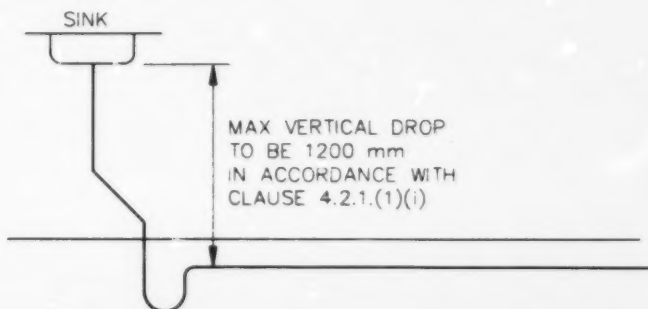
# Clause 4.2.1.(1)(i) ISLAND FIXTURE

## ISLAND FIXTURE

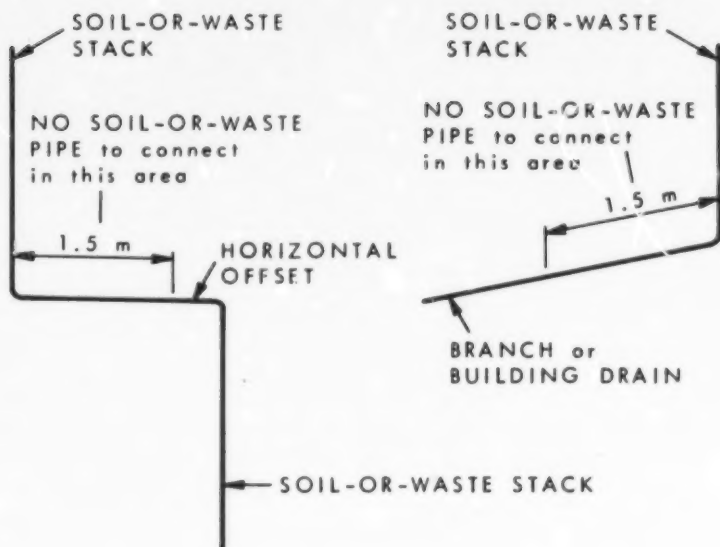


### MAXIMUM LENGTH A

- 1) One family dwelling (2" pipe) - 2.4 m
- 2) Commercial Multiple Drains (3" pipe) - 3.6 m  
e.g. beer parlour (4" pipe) - 4.8 m
- 3) Length is to be in accordance with sentence 5.6.3.(1)



**Sentences 4.2.1.(2) and (3) SOIL-OR-WASTE PIPE CONNECTIONS**

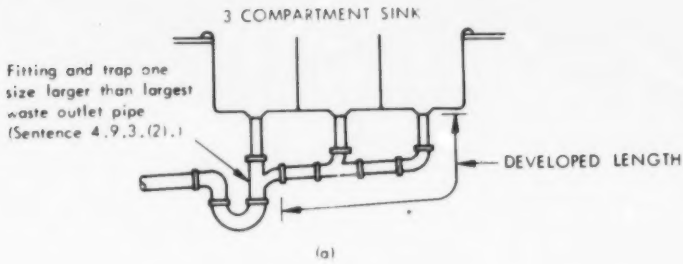


(a) Connection to nominally horizontal offset

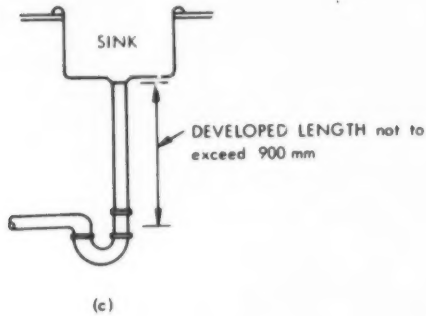
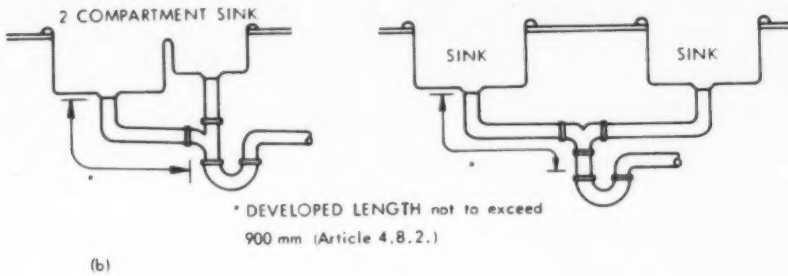
(b) Connection to nominally horizontal soil-or-waste pipe

**Sentence 4.4.3.(1) Grease Interceptors.** Grease interceptors may be required when it is considered that the discharge of excessive grease may impair the drainage system. Information on the design, sizing and placement of grease interceptors can be found in ASPE 1977-78, Data Book, Volume 2, "Special Plumbing Systems Design."

# **Sentence 4.5.1.(2) TRAPPING OF SINKS AND LAUNDRY TRAYS**

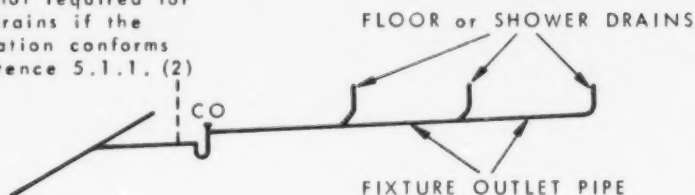


\* DEVELOPED LENGTH not to exceed 900 mm (Article 4.8.2.)

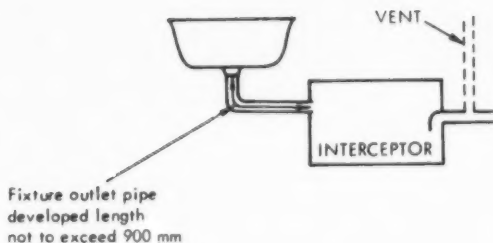


**Sentence 4.5.1.(3) SINGLE TRAPS FOR FIXTURE GROUPS**

VENT not required for floor drains if the installation conforms to Sentence 5.1.1. (2)



Floor drains and shower drains

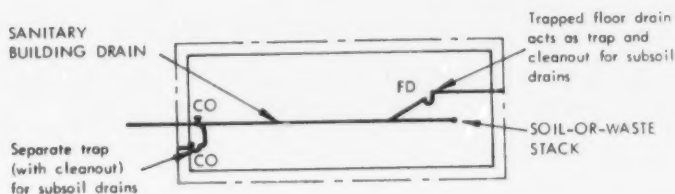
**Sentence 4.5.1.(5) LOCATION OF TRAP OR INTERCEPTOR**

An interceptor that replaces a trap must be vented in the same way as the trap it replaces. (See explanation for Clauses 4.2.1.(1)(a) and (d). Where an interceptor other than an oil interceptor serves a group of fixtures requiring more than one trap, each fixture must be properly trapped and vented. (See Article 5.5.2. for venting of oil interceptors.)

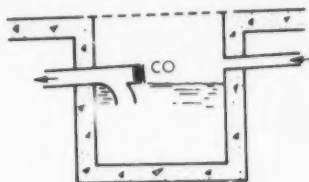
### Sentence 4.5.2.(1)

When an untrapped leader drains to a combined building sewer, clearance requirements are the same as for vent terminals. (See explanation for Sentence 5.6.5.(3).)

### Article 4.5.3. SUBSOIL DRAINAGE CONNECTIONS



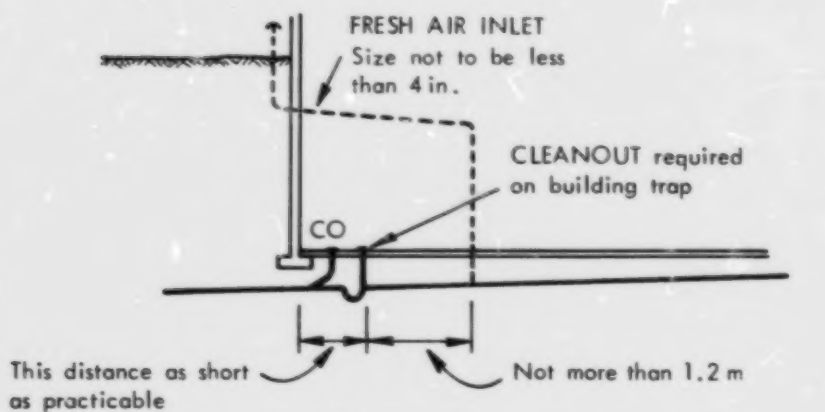
(a) Connections to sanitary drainage system (Plan View)



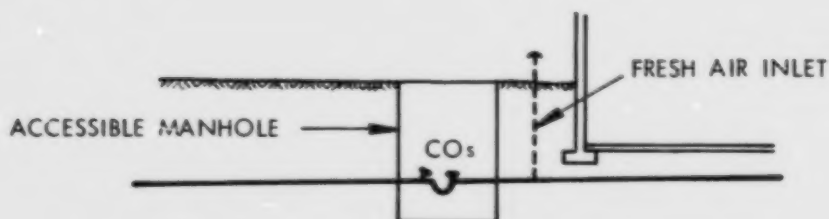
(b) Trapped sump

This Code does not regulate the installation of subsoil drainage pipes, but does regulate the connection of such pipes to the plumbing system. The intent of this Article is to place a trap between the subsoil drainage pipe and the sanitary drainage system. The cleanout must be installed in accordance with Sentence 4.7.1.(2). A trap or sump may be provided specifically for the subsoil drains, or advantage may be taken of the trap of a floor drain or storm water sump as shown above.

## Sentence 4.5.4.(1) LOCATION OF BUILDING TRAPS



(a) Building trap inside building

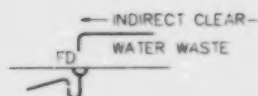


(b) Building trap outside building

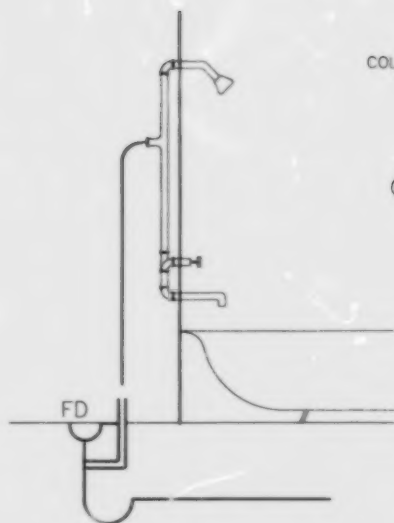
# Article 4.5.5. MAINTAINING TRAP SEALS



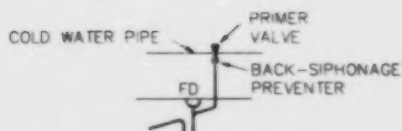
(a) Flush tank



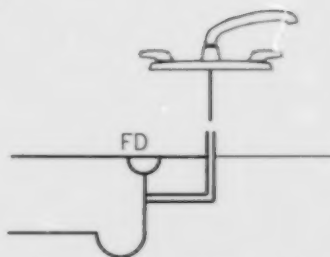
(b) Indirect waste



(d) Shower

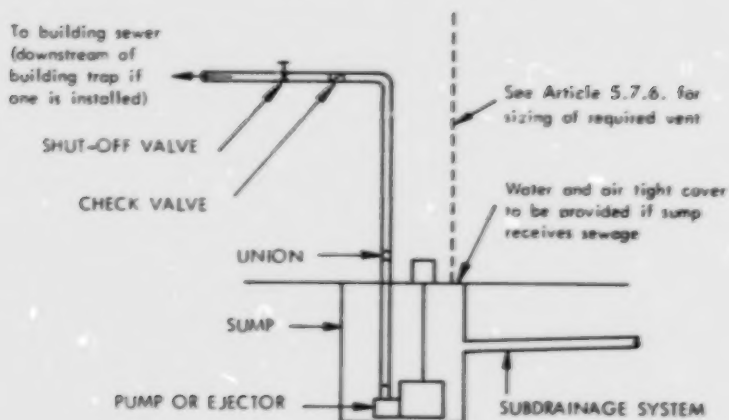


(c) Trap seal primer



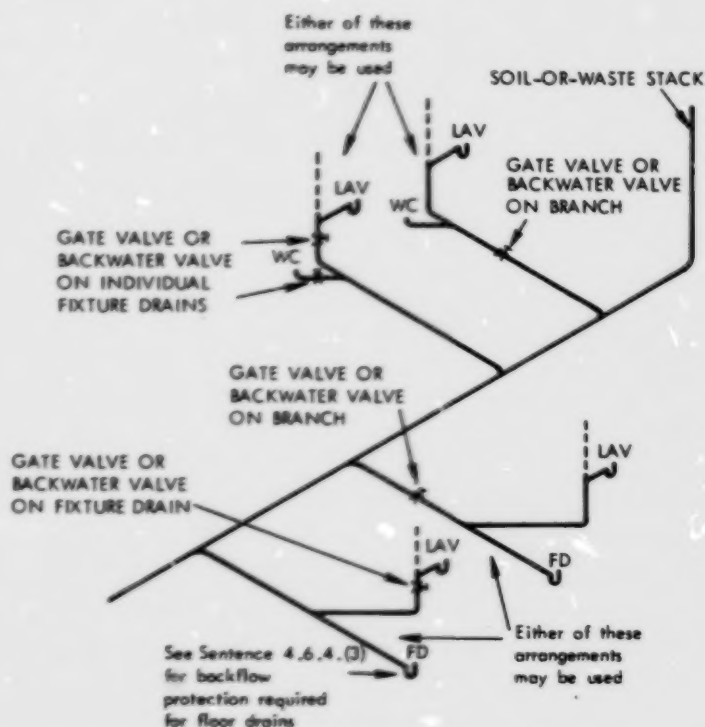
(e) Faucet

### Article 4.6.3. ARRANGEMENT OF PIPING AT SUMP

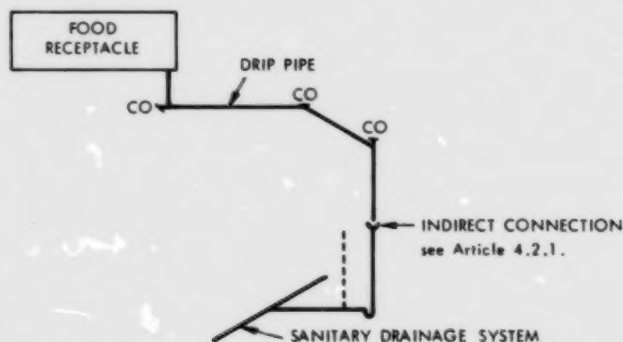


In most installations controls will be installed in conjunction with a float to automatically empty the sump. If such controls are not provided, the capacity of the sump should equal the maximum inflow to the sump that is expected to occur during any 24 h period.

# Article 4.6.4. PROTECTION FROM BACKFLOW CAUSED BY SURCHARGE



These requirements are intended to apply when in the opinion of the authority having jurisdiction there is danger of backup from a public sewer.

**Sentence 4.7.1.(8) CLEANOUTS FOR FOOD RECEPTABLE DRIP PIPES****Article 4.8.1.**

Although slopes below 1 in 50 are permitted for pipes 4 in. and over, it is recommended that they be used only where necessary. Steeper slopes and higher velocities will help to keep pipes clean by moving heavier solids that might tend to clog the pipes.

**Sentence 4.9.3.(2)**

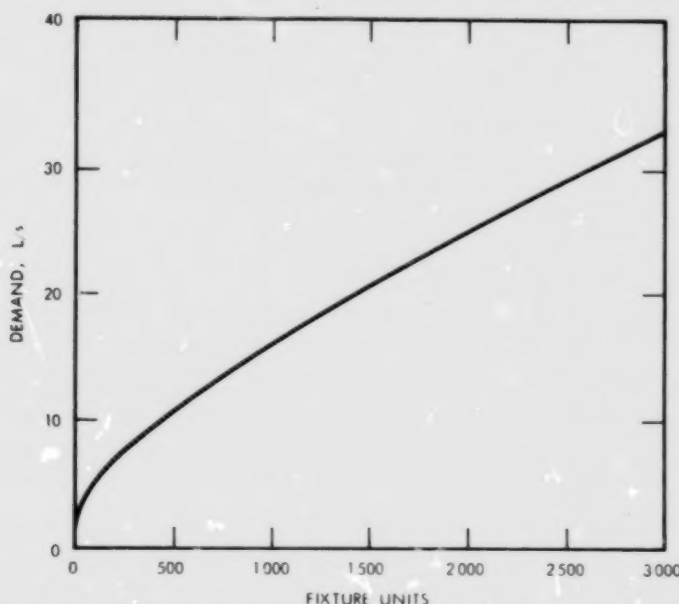
Fixture outlet pipes that are common to 2 or 3 compartments or fixtures are sometimes referred to as continuous wastes and are not considered to be branches. (See also explanation for Sentence 4.5.1.(2).)

**Subsection 4.10 DETERMINATION OF HYDRAULIC LOADS AND DRAINAGE PIPE SIZES****Hydraulic Loads**

The hydraulic load that is imposed by a fixture is represented by a factor called a fixture unit. Fixture units are dimensionless and take into account the rate of discharge, time of discharge and frequency of discharge of the fixture.

Confusion often arises when attempts are made to convert fixture units to litres per second because there is no straightforward relationship between the two. The proportion of the total number of fixtures that can be expected to discharge simultaneously in a large system is smaller than in a small system. For example, doubling the number of fixtures in a system will not double the peak flow that the system must carry, although of course the flow will be increased somewhat. The following curve shows the relationship that was used in constructing the tables of capacities of stacks, branches, sanitary building drains and sanitary building sewers (Tables 4.10.B. to 4.10.D.).

### Subsection 4.10 (Cont'd.)



Although the above curve was used to prepare Code tables, it was not included in the B.C. Plumbing Code. Instead, a single approximate conversion factor is given in the Code so that a continuous flow from a fixture may be converted from litres per second to fixture units in order to determine the total hydraulic load on the sanitary drainage system. The conversion factor which is given in Sentence 4.10.3.(1) is 26.4 fixture units for each litre per second of flow. The discharge from a continuous flow fixture in litres per second when multiplied by 26.4 gives the hydraulic load in fixture units, and this load is added to the fixture unit load from other fixtures to give the total load that the sanitary drainage pipe must carry.

The hydraulic load that is produced by storm water runoff depends on the size of the area that is drained and local rainfall intensity. The capacities of storm drainage pipes and combined sewers in Tables 4.10.E. to 4.10.G. have been expressed in terms of the number of litres that they can carry when the local rainfall intensity is 1 mm in 15 min. The hydraulic load for a particular location is obtained by simply multiplying the rainfall intensity figure given by the authority having jurisdiction or Chapter 1 of the "Supplement to the NBC 1985" by the actual area drained as specified in Sentence 4.10.4.(1).

When plumbing fixtures are connected to a combined sewer, the hydraulic load from the fixtures must be converted from fixture units to litres or, in the case of continuous flow, from litres per second to litres so that these loads can be added to the hydraulic loads from roofs and paved surfaces. As already pointed out, the relationship between fixture units and litres per second and, consequently, the relationship between fixture units and litres is not straightforward, and an approximate conversion factor has been adopted. The conversion factor which is given in Sentence 4.10.5.(1) is 9.1 L fixture unit, except where the load is less than 260 fixture units when a round figure of 2 360 L is to be used. In the case of continuous flow fixtures that are connected to combined sewers or storm sewers, the conversion factor given in Sentence 4.10.3.(2) is 900 L per L/s. This conversion factor is not an approximation but is an exact calculation.

### Subsection 4.10 (Cont'd.)

It should be noted carefully that the conversion factors given in Sentences 4.10.3.(1) and 4.10.5.(1) are designed to convert in one direction only, and must not be used to convert from fixture units to litres per second in the one instance nor from litres to fixture units in the other instance.

In summary it should be noted that:

- (a) in sanitary drainage systems all hydraulic loads are converted to fixture units, and
- (b) in storm drainage systems or combined drainage systems all hydraulic loads are converted to litres.

#### Procedure for Selecting Pipe Sizes

The following is an outline, with examples, of the procedures to be followed in determining the size of each section of drainage piping.

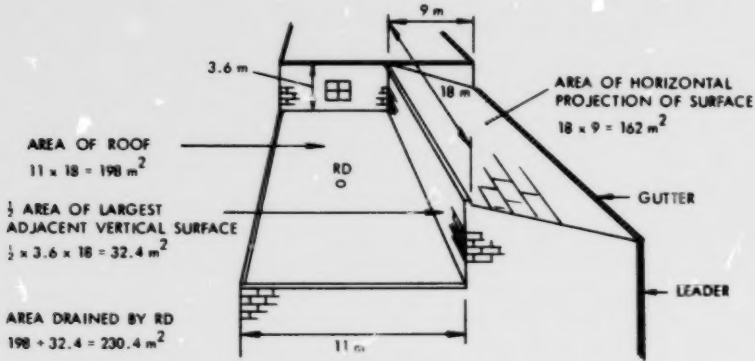
1. Sanitary drainage pipes, for example, branches, stacks, building drains or building sewers
  - (a) Determine the load in fixture units from all fixtures except continuous flow fixtures,
  - (b) Determine the load in litres per second from all continuous flow fixtures and multiply the number of litres per second by 26.4 to obtain the number of fixture units,
  - (c) Add loads (a) and (b) to obtain the total hydraulic load on pipe in fixture units, and
  - (d) Consult the appropriate table from Tables 4.10.B., 4.10.C. or 4.10.D. and select the pipe size.  
(Note that no pipe size can be smaller than that permitted in Subsection 4.9.)
2. Storm drainage pipes, for example, gutters, leaders, horizontal pipes, building drains or building sewers
  - (a) Determine the area in square metres of roofs and paved surfaces according to Sentence 4.10.4.,
  - (b) Determine the local rainfall intensity (15 min rainfall) from the authority having jurisdiction or Chapter 1 of the "Supplement to the NBC 1980,"
  - (c) Multiply (a) by (b) to obtain the hydraulic load in litres,
  - (d) If a fixture discharges a continuous flow to the storm system, multiply its load in litres per second by 900 to obtain the hydraulic load in litres,
  - (e) Add loads (c) and (d) to obtain the total hydraulic load on the pipe in litres, and
  - (f) Consult the appropriate table from Tables 4.10.E., 4.10.F. or 4.10.G. and select pipe or gutter size.  
(Note that no pipe size can be smaller than that permitted in Subsection 4.9.)
3. Combined drainage pipes, for example, building drains or building sewers
  - (a) Determine the total load in fixture units from all fixtures except continuous flow fixtures,
  - (b) If the fixture unit load exceeds 750, multiply it by 9.1 to determine the equivalent hydraulic load in litres. If the fixture unit load is 260 or fewer fixture units, the hydraulic load is 2 360 L,
  - (c) Obtain the hydraulic load from roofs and paved surfaces in the same manner as for storm drains (see 2(a), (b) and (c) ),
  - (d) Obtain the hydraulic load in litres from any continuous flow source that is connected to the sanitary or storm drainage system in the same manner as for storm drainage pipes (see 2(d) ),
  - (e) Add hydraulic loads (b), (c) and (d) to obtain the total hydraulic load on pipe in litres, and
  - (f) Consult Table 4.10.E. and select the pipe size.  
(Note that no pipe can be smaller than that permitted in Sub-section 4.9.)

## Subsection 4.10 (Cont'd.)

### Examples

Example 1: Determination of the size of storm drainage components for building shown in the following 2 diagrams.

Storm Drainage Areas (Example I)



Step No. 1 Determine the hydraulic load from the roofs.

Area drained by gutter  $162 \text{ m}^2$   
 Area drained by roof drain  $230.4 \text{ m}^2$

If the local rainfall intensity is 25 mm

the load on the gutter (leader No. 2)  
 is  $(25 \times 162)$  ..... 4 050 L  
 the load on the roof drain (leader No. 1)  
 is  $(25 \times 230.4)$  ..... 5 760 L

If the local rainfall intensity is 15 mm

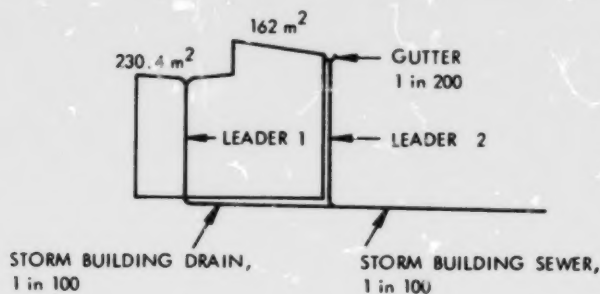
the load on the gutter (leader No. 2)  
 is  $(15 \times 162)$  ..... 2 430 L  
 the load on the roof drain (leader No. 1)  
 is  $(15 \times 230.4)$  ..... 3 456 L

### Subsection 4.10 (Cont'd.)

Step No. 2 Determine the size of storm drainage components.

Using the appropriate hydraulic loads, the size of storm drainage components can be determined from Tables 4.10E., 4.10.F. and 4.10.G. These values are tabulated in the Table below for rainfall intensities of 25 mm and 15 mm in 15 min.

Storm Drainage Components (Example I) (Elevation View)



Storm Drainage Pipe Sizes (Example I)

|                         | Area<br>Drained<br>m <sup>2</sup> | 15 min.<br>Rainfall Intensity, mm |             |                        |             | Reference<br>Table<br>No. |
|-------------------------|-----------------------------------|-----------------------------------|-------------|------------------------|-------------|---------------------------|
|                         |                                   | 25                                |             | 15                     |             |                           |
|                         |                                   | Hydraulic<br>Load<br>L            | Size<br>in. | Hydraulic<br>Load<br>L | Size<br>in. |                           |
| Roof drain leader       | 230.4                             | 5 760                             | 4           | 3 456                  | 3           | 4.10.G.                   |
| Gutter                  | 162                               | 4 050                             | 8           | 2 430                  | 7           | 4.10.F.                   |
| Gutter leader           | 162                               | 4 050                             | 3           | 2 430                  | 2½          | 4.10.G.                   |
| Storm building<br>drain | 230.4                             | 5 760                             | 5           | 3 456                  | 4           | 4.10.E.                   |
| Storm building<br>sewer | 392.4                             | 9 810                             | 6.          | 5 886                  | 5           | 4.10.E.                   |
| Column 1                | 2                                 | 3                                 | 4           | 5                      | 6           | 7                         |

### Subsection 4.10 (Cont'd.)

#### Example II: Determination of Size of Drainage Pipes for Buildings

The following diagram represents an office building with washrooms for men and women, a drinking fountain and cleaner's closet on each typical floor. The equipment room with facilities is located in the basement. The building is 18 m by 30 m and is to be built in British Columbia.

##### A. Hydraulic Load per Typical Floor

|           |   |                         |
|-----------|---|-------------------------|
| 5WC @ 6   | = | 30 fixture units        |
| 2 UR @ 1½ | = | 3 fixture units         |
| 4LAV @ 1½ | = | 6 fixture units         |
| 2FD @ 3   | = | 6 fixture units         |
| 1FS @ 3   | = | 3 fixture units         |
| 1DF @ 1   | = | 1 fixture unit          |
|           |   | <u>49 fixture units</u> |

The reader is left to calculate the size of the branches, one of which must be 4 in. and another 3 in. (see Subsection 4.9). Therefore the smallest part of the stack must be 4 in.

##### B. Hydraulic Load on Stack

|                              |   |                   |
|------------------------------|---|-------------------|
| 5 storeys @ 49 fixture units | = | 245 fixture units |
|------------------------------|---|-------------------|

Table 4.10.B. Column 3 permits 4 in. pipe. Use 4 in. pipe.

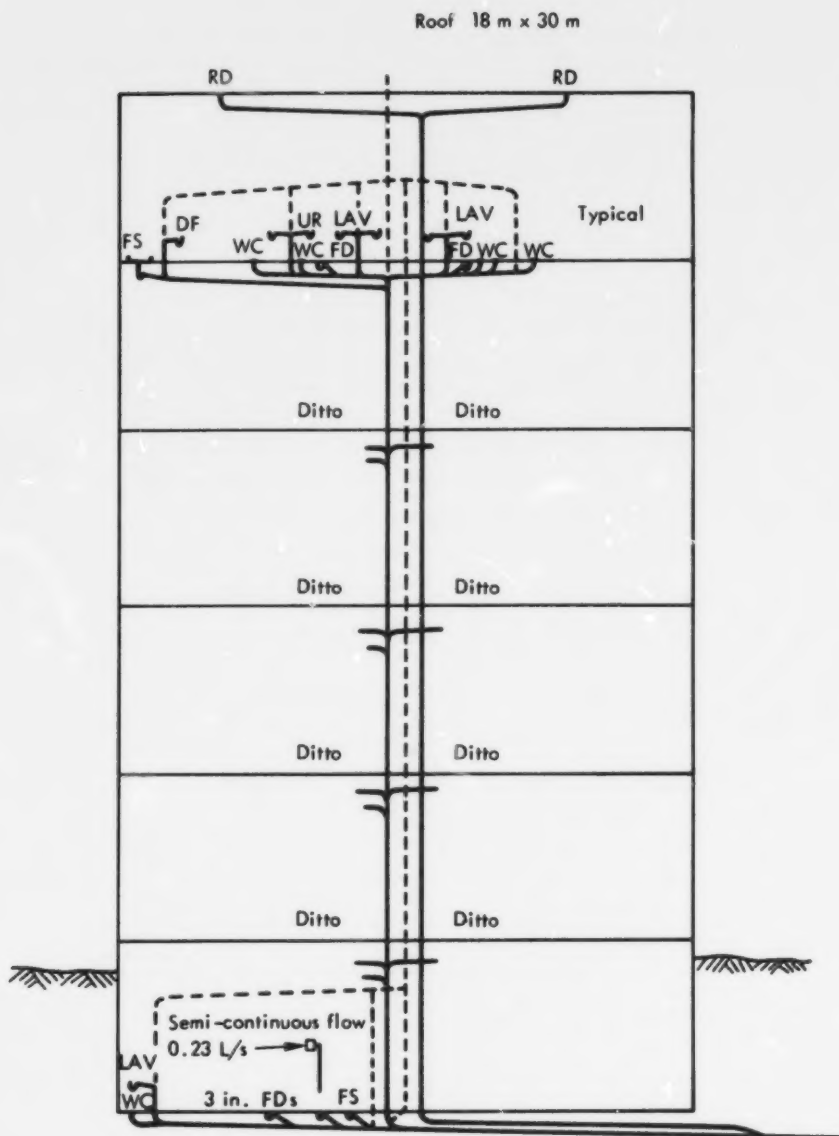
##### C. Hydraulic Load on Basement Branch

|                      |   |                        |
|----------------------|---|------------------------|
| 1WC @ 6              | = | 6 fixture units        |
| 1LAV @ 1             | = | 1 fixture unit         |
| 2FD @ 3              | = | 6 fixture units        |
| 1FS @ 3              | = | 3 fixture units        |
| Semi-continuous Flow |   |                        |
| 0.23L/s x 26.4       | = | <u>6 fixture units</u> |

22 fixture units

Table 4.10.C. Column 2 permits 3 in. pipe. Use 3 in. pipe.

# Subsection 4.10 (Cont'd.) BUILDING DRAINAGE SYSTEM (EXAMPLE II.)



### Subsection 4.10 (Cont'd.)

#### D. Hydraulic Load on Building Drain

|                          |                         |
|--------------------------|-------------------------|
| From soil-or-waste stack | 245 fixture units       |
| From basement branch     | <u>22 fixture units</u> |
|                          | 267 fixture units       |

Table 4.10.D. Column 6 @ 1 in 50, a 4 in. pipe will carry 240 fixture units

Table 4.10.D. Column 7 @ 1 in 25, a 4 in. pipe will carry 300 fixture units

For practical reasons use a 4 in. pipe at a slope of not less than 1 in 32.

#### E. Storm Load

Area of roof  $18 \times 30 = 540 \text{ m}^2$

Rainfall intensity for a location from Chapter 1 of the "Supplement to the NBC 1980" is 28 mm in 15 min.

Total hydraulic storm load  $= 28 \times 540 = 15\,120 \text{ L}$

Storm load on each roof drain  $15\,120/2 = 7\,560 \text{ L}$

#### F. Size of Horizontal Leaders

Table 4.10.E. Column 8 @ 1 in 25, a 4 in. pipe will carry a load of 8 430 L

Table 4.10.E. Column 7 @ 1 in 100, a 5 in. pipe will carry a load of 7 650 L

Table 4.10.E. Column 4 @ 1 in 133, a 6 in. pipe will carry a load of 10 700 L

Therefore use a 5 in. pipe at a slope of 1 in 100.

#### G. Size of Vertical Leader

Table 4.10.G. Column 2 would permit a 5 in. pipe (19 500 L) but they are not readily available.

For practical reasons use a 6 in pipe.

#### H. Size of Storm Building Drains

Since a drainage pipe cannot be smaller than any upstream pipes, the storm building drain must be at least 6 in. Referring again to Table 4.10.E., we see that a 6 in. pipe will carry a hydraulic load of 17 600 L at a slope of 1 in 50. Therefore use a 6 in. pipe at a slightly higher slope.

#### I. Size of Combined Building Sewer

|                                                                                              |                 |
|----------------------------------------------------------------------------------------------|-----------------|
| (a) Total sanitary load excluding semi-continuous flow 261 fixture units converted to litres |                 |
| (Clause 4.10.5.(1)(b) $\times 9.1 =$ .....                                                   | 2 375 L         |
| (b) Semi-continuous flow 0.23 L/s converted to litres                                        |                 |
| (Sentence 4.10.3.(2)) $\times 900 =$ .....                                                   | 207 L           |
| (c) Storm load .....                                                                         | <u>17 820 L</u> |
| Total hydraulic load .....                                                                   | 20 402 L        |

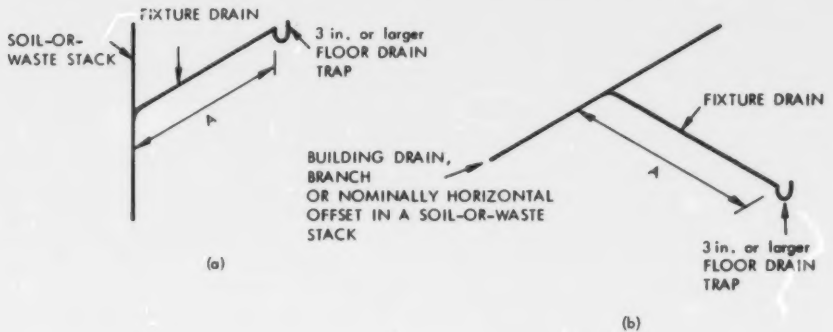
Referring to Table 4.10.E. @ 1 in 50, a 6 in. pipe will carry 17 600 L

Referring to Table 4.10.E. @ 1 in 25, a 6 in. pipe will carry 24 900 L

Therefore use a 6 in. pipe at a slope of not less than 1 in 32.

**Sentence 4.10.4.(1)**

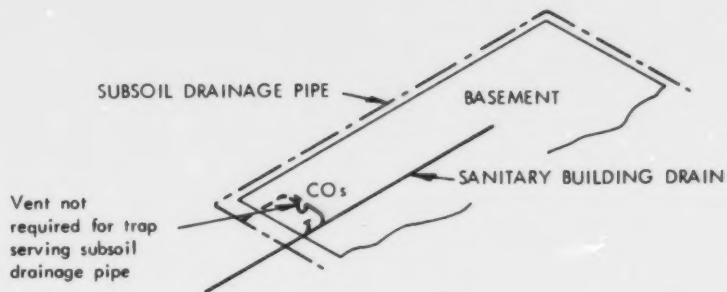
Climate information on rainfall intensities for various cities may be found in Chapter 1 of the "Supplement to the NBC 1980" but should be supplied by the local authority having jurisdiction.

**Sentence 5.1.1.(2) TRAPPING OF FLOOR DRAINS**

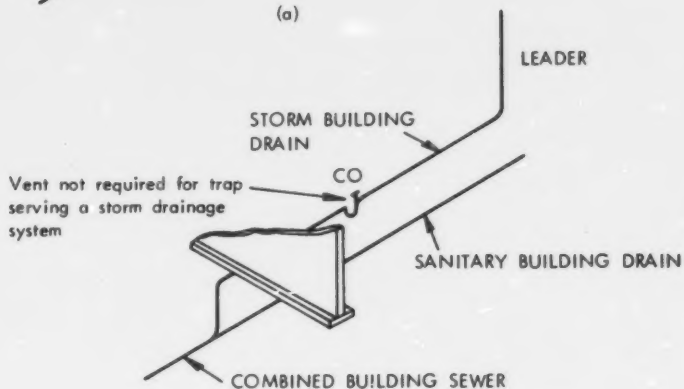
Length of "A" must be at least 450 mm and its fall shall not exceed the size of the pipe

| Size of Fixture Drain | Length A |
|-----------------------|----------|
| 3 in.                 | 3.6 m    |
| 4 in.                 | 4.8 m    |
| 6 in.                 | 7.3 m    |

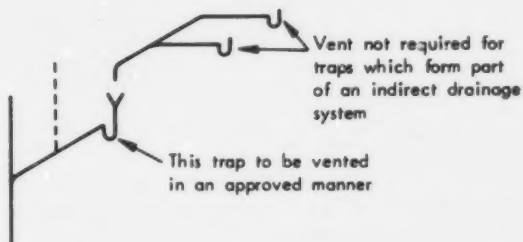
# **Sentence 5.1.1.(3) VENTING NOT REQUIRED**



(a)

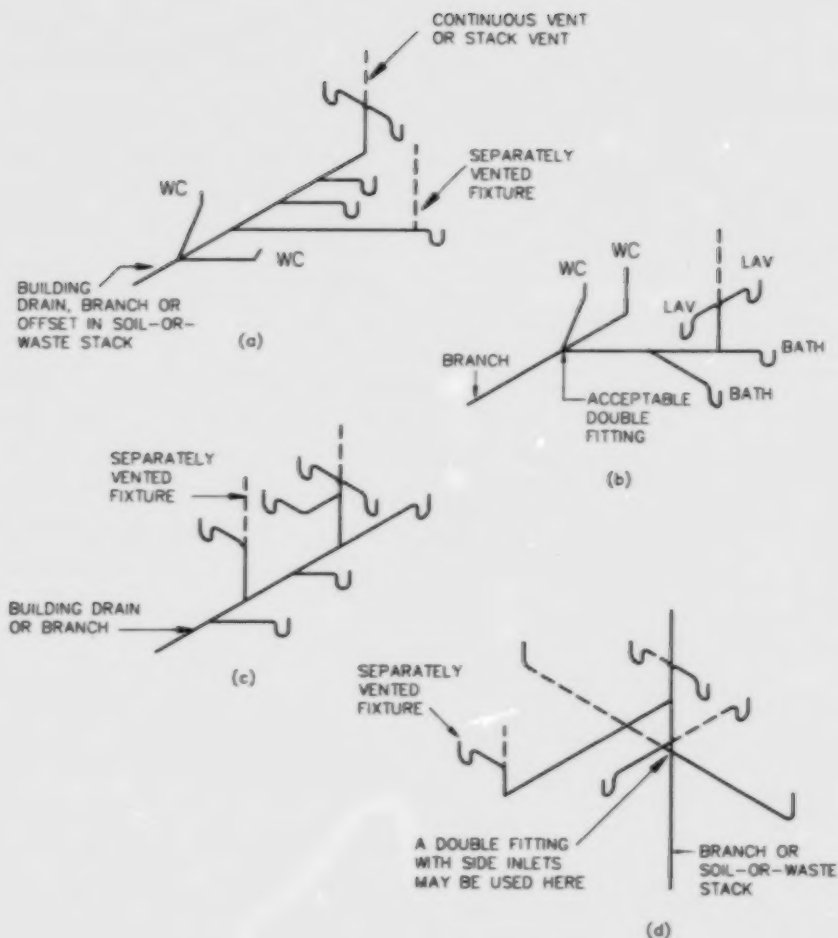


(b)



(c)

# Article 5.2.1. WET VENTING

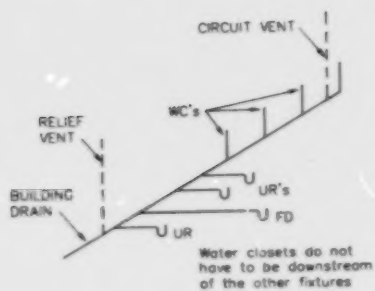


Each section of a wet vent is sized according to the total load it serves (see Article 5.8.1.). Separately vented fixtures may connect to a wet vent.

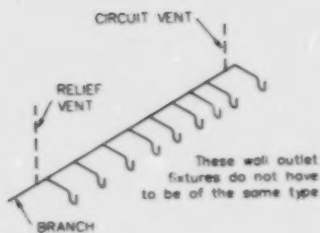
Fixture drains are connected separately and directly into the branch or soil-or-waste stack in conformance with Article 5.6.3.

The length of a wet vent is not restricted.

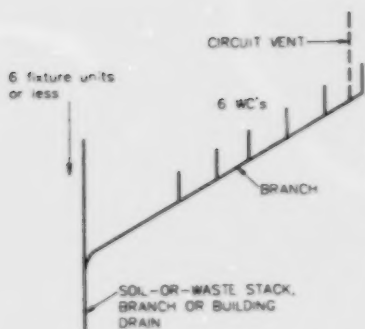
# Sentences 5.3.1.(1), (2), (3) and (4) CIRCUI T VENTS



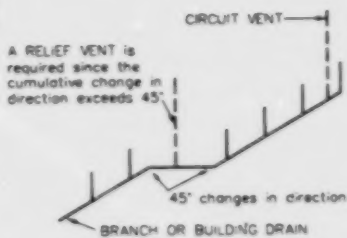
(a)



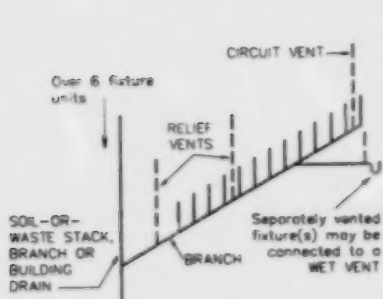
(b)



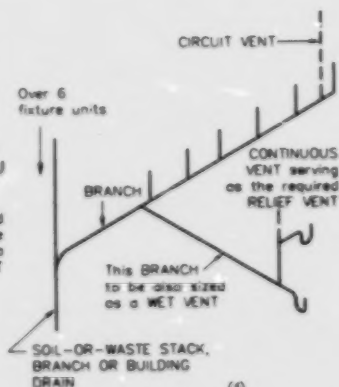
(c)



(d)

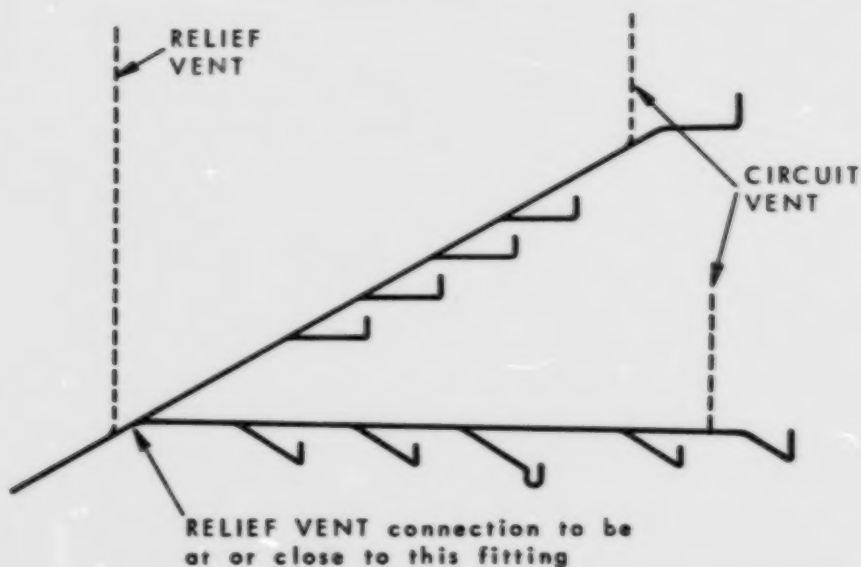
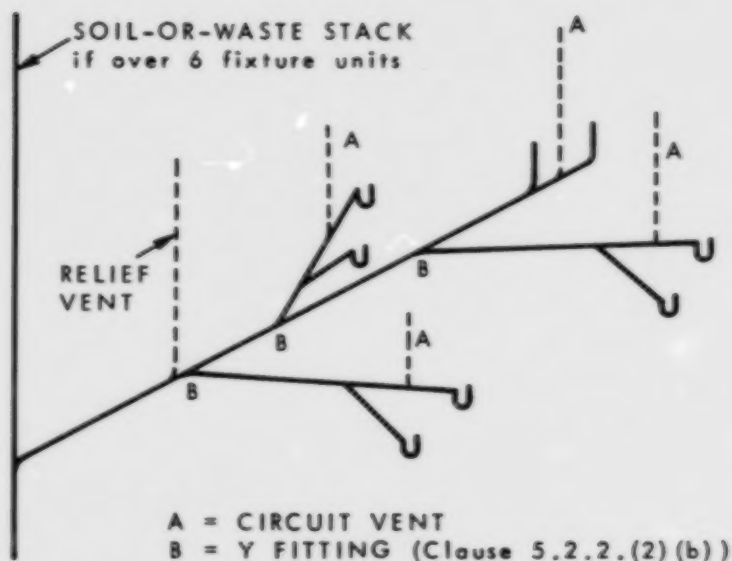


(e)

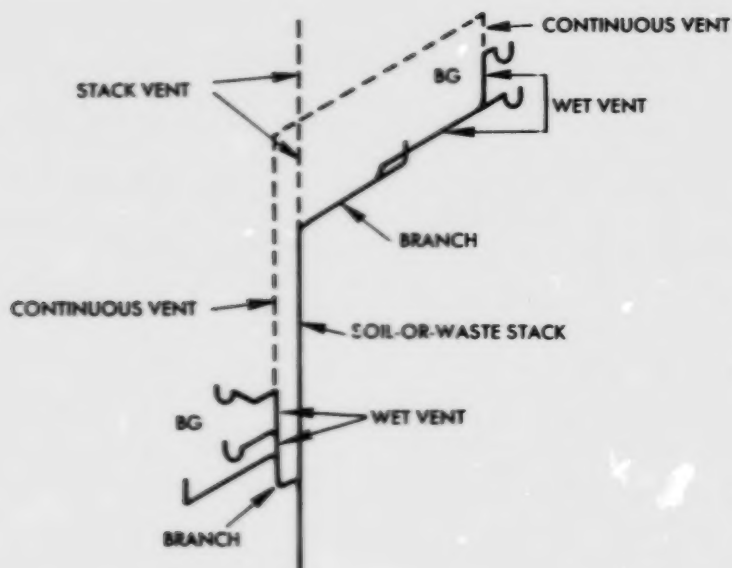


(f)

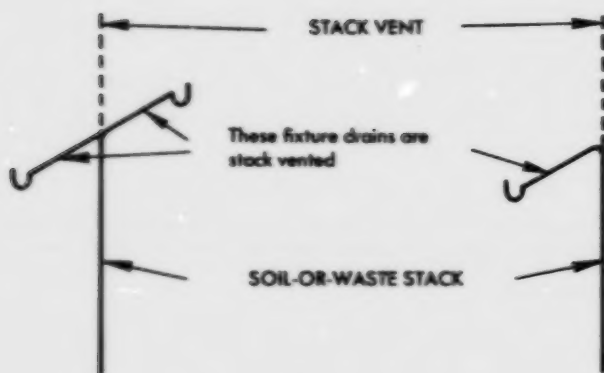
**Sentence 5.3.1.(4) CIRCUIT VENTING WITH COMBINED RELIEF VENTS**



## Article 5.4.1. STACK VENTS

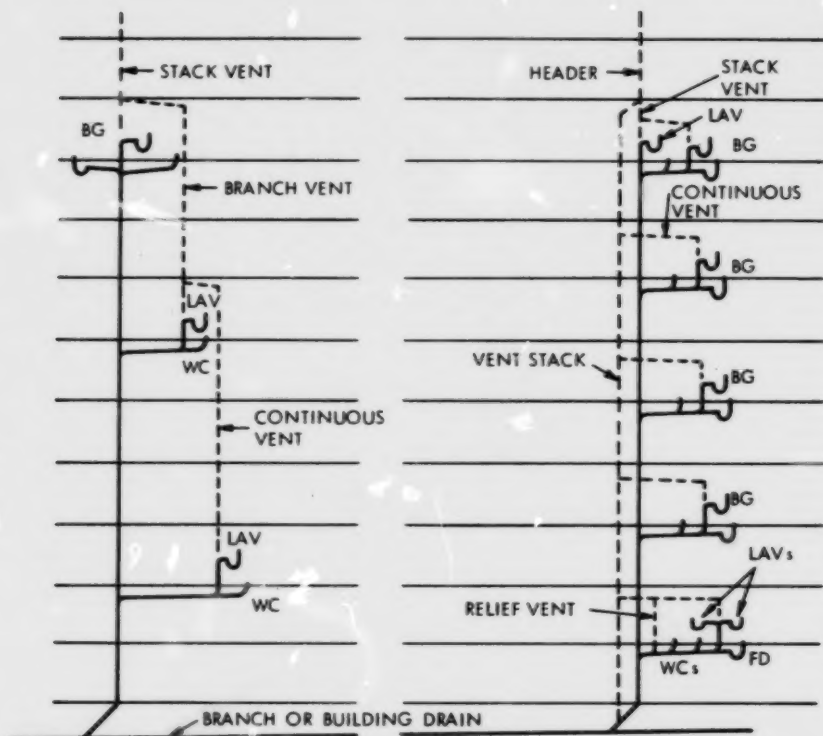


(a)



(b)

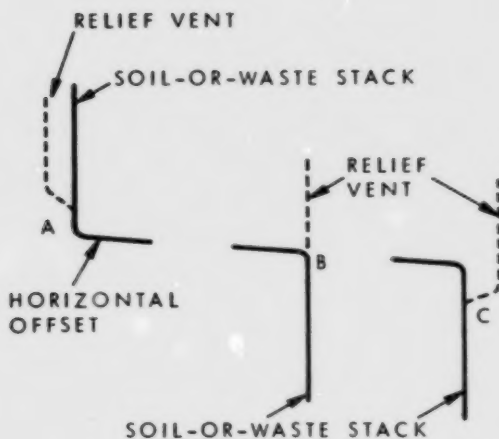
## Article 5.4.2. VENT STACKS



No vent stack required.  
(Fixtures draining to the  
soil-or-waste stack from  
3 storeys only)

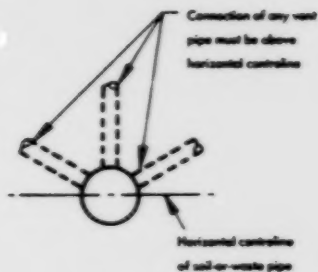
Vent stack required.  
(Fixtures draining to  
the soil-or-waste stack  
from more than 4 storeys)

Vent stack may terminate at the lowest soil-or-waste connection or immediately below it or it may terminate at the junction of soil-or-waste stack and branch or building drain. The vent stack may also be connected at its lower end to the soil-or-waste stack below the lowest soil-or-waste pipe connection.

**Article 5.4.4. RELIEF VENTS FOR OFFSETS**

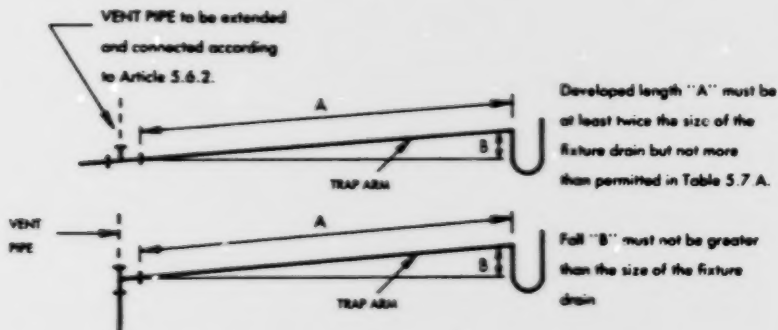
When an offset is greater than 1.5m, the offset must be sized as a branch or building drain (see Sentence 4.10.6.(2)). A relief vent is required at A, B or C.

### Sentence 5.6.2.(2) VENT PIPE CONNECTIONS



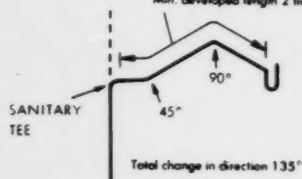
Fittings used to connect vent pipes to nominally horizontal soil-or-waste pipes are specified in Subsection 2.4.

### Sentence 5.6.3.(1) VENT CONNECTIONS

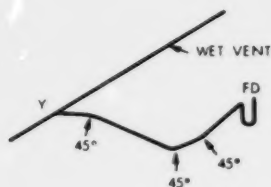


# **Clause 5.6.3.(1)(c) and Sentence 5.6.3.(2) LOCATION OF VENT PIPES**

Max. fall of trap arm equal to size  
 Max. developed length in accordance with Table 5.7.A.  
 Min. developed length 2 times size

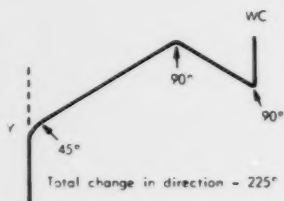


(a)

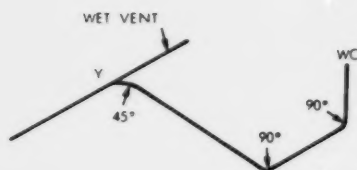


(b)

5.6.3.(1)(c)

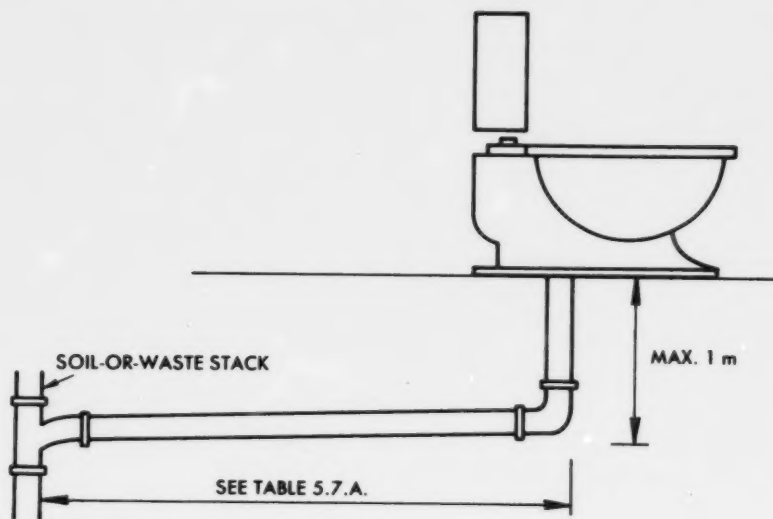
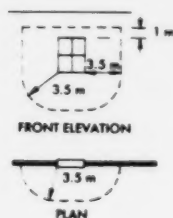


(c)



(d)

5.6.3.(2)

**Sentence 5.6.3.(3) LENGTH OF WC FIXTURE DRAIN****Sentence 5.6.5.(3) VENT TERMINALS**

(a)

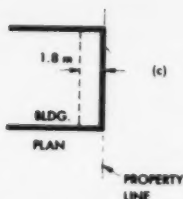


SIDE ELEVATION



Roof for uses in addition to weather protect (if roof used only for weather protection terminal to be high enough to exclude water.)

(b)



(c)

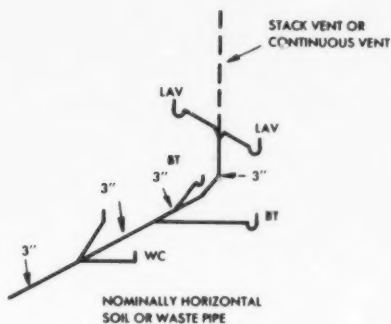
No vent pipe other than a fresh air inlet may terminate within the limits indicated. Subsection 5.8 sizing of vent pipes.



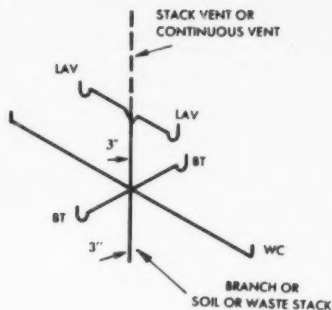
**Subsection 5.8 (Cont'd.) TABLE OF VENT PIPE SIZES**

| Vent Pipe                             | Developed Length Used to Determine Size, m | Hydraulic Load Used to Determine Size, fixture units | Code Reference to be Considered                   | Minimum Size in |
|---------------------------------------|--------------------------------------------|------------------------------------------------------|---------------------------------------------------|-----------------|
| Continuous vent (ac)                  | 32.9 (acegjl)                              | 7                                                    | 5.7.1<br>5.8.2(1)                                 | 2               |
| Sump vent (bc)                        | N/A                                        | 7                                                    | 5.7.6                                             | 2               |
| Branch vent (ce)                      | 32.9 (acegjl)                              | 7                                                    | 5.7.1, 5.8.2(1)<br>5.7.2, 5.8.2(4)                | 2               |
| Continuous vent (de)                  | 20.4 (degjl)                               | 6                                                    | 5.7.1, 5.8.2(2)<br>5.8.2(1)                       | 1½              |
| Branch vent (eg)                      | 32.9 (acegjl)                              | 13                                                   | 5.7.1, 5.8.2(1)<br>5.7.2, 5.8.2(4)                | 2               |
| Continuous vent (fg)                  | 17.7 (fgjl)                                | 6                                                    | 5.7.1, 5.8.2(2)<br>5.8.2(1)                       | 1½              |
| Branch vent (gg)                      | 32.9 (acegjl)                              | 19                                                   | 5.7.1, 5.8.2(1)<br>5.7.2, 5.8.2(4)                | 2               |
| Circuit vent (hj)                     | 7.6 (hjl)                                  | 22                                                   | 4.2.1(1)(e), 5.8.2(1)<br>5.7.1, 5.8.2(3)<br>5.8.1 | 1½              |
| Branch vent (jl)                      | 32.9 (acegjl)                              | 41                                                   | 5.7.1, 5.8.2(1)<br>5.7.2, 5.8.2(4)                | 3               |
| Stack vent (kl)                       | 4.2 (klQR)                                 | 36                                                   | 5.7.1, 5.8.3(1)<br>5.7.2, 5.8.3(2)                | 2               |
| Stack vent (lQ)                       | 4.2 (klQR)                                 | 43                                                   | 5.7.1, 5.8.3(1)<br>5.7.2, 5.8.3(2)                | 3               |
| Vent Stack Section (AGJNPQR)          | 34.3 (AGJNPQR)                             | 59½                                                  | 4.9.1, 5.8.3(1)<br>5.7.1, 5.8.3(2)                | 3               |
| Circuit vent (DF)                     | 6.1 (DFG)                                  | 32                                                   | 4.2.1(1)(e), 5.8.2(1)<br>5.7.1, 5.8.2(3)<br>5.8.1 | 1½              |
| Continuous vent (EF)<br>(Relief Vent) | N/A                                        | 34                                                   | 4.2.1(1)(c), 5.7.1,<br>5.3.1(2), 5.7.3            | 1½              |
| Branch vent (FG)                      | 6.1 (DFG)                                  | 34                                                   | 5.7.1, 5.8.2(4)<br>5.8.2(1)                       | 1½              |
| Continuous vent (HJ)                  | 1.8 (HJ)                                   | 6                                                    | 5.7.1, 5.8.2(2)<br>5.8.2(1)                       | 1½              |
| Individual vent (KM)                  | N/A                                        | 1                                                    | 5.7.1                                             | 1¼              |
| Dual vent (LM)                        | N/A                                        | 2                                                    | 5.7.1                                             | 1¼              |
| Branch vent (MN)                      | 7.0 (KMN)                                  | 3                                                    | 5.7.1, 5.8.2(4)<br>5.8.2(1)                       | 1¼              |
| Stack vent (OP)                       | 19.1 (OPQR)                                | 59½                                                  | 5.7.1, 5.8.3(2)<br>5.8.3(1)                       | 2½              |
| Header (PQ)                           | 34.3 (AGJNPQR)                             | 59½                                                  | 5.7.1, 5.8.2(5)<br>5.8.2(1)                       | 3               |
| Header (QR)                           | 34.3 (AGJNPQR)                             | 102½                                                 | 5.7.1, 5.8.2(5)<br>5.8.2(1)                       | 4               |
| Column 1                              | 2                                          | 3                                                    | 4                                                 | 5               |

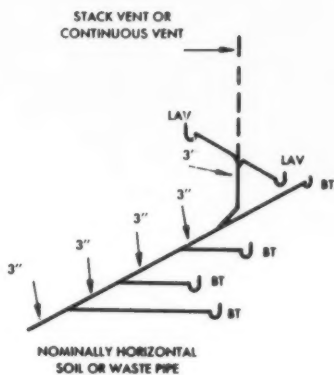
# Article 5.8.1. SIZING OF WET VENT SYSTEMS



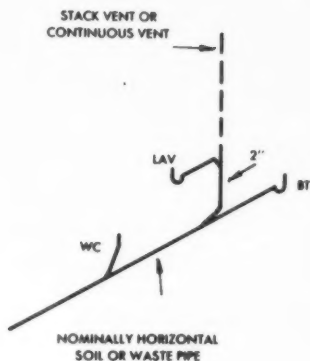
(a)



(b)

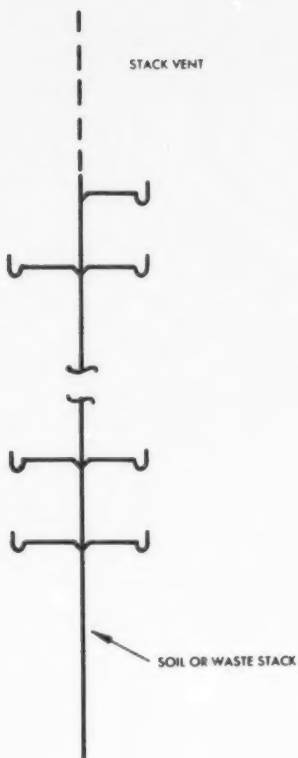


(c)



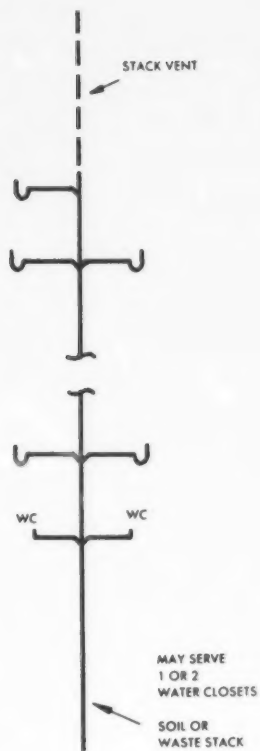
(d)

# Article 5.8.1.(Cont'd.) SIZING WET VENT SYSTEMS



(e)

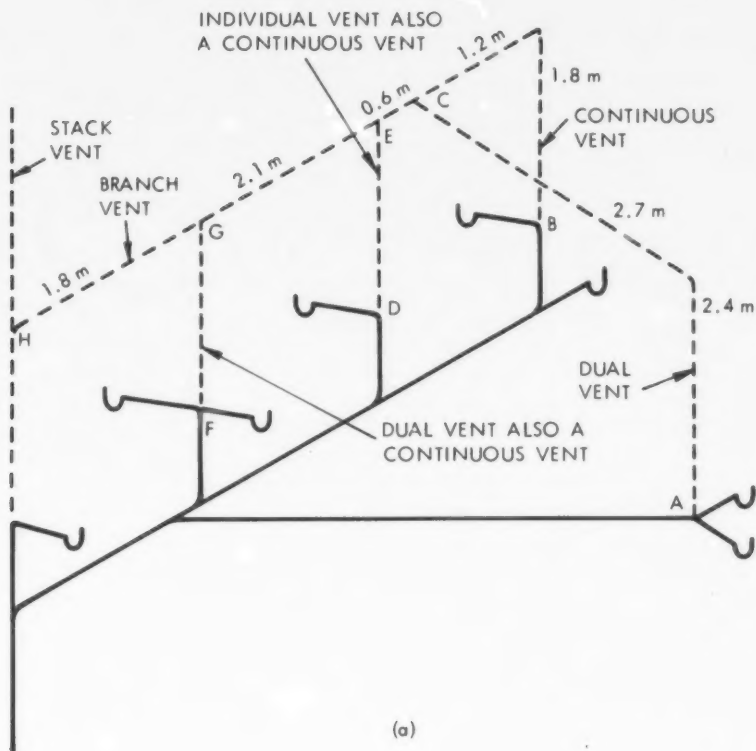
Not serving water closets

WET VENT  
PORTION

(f)

Serving water closets

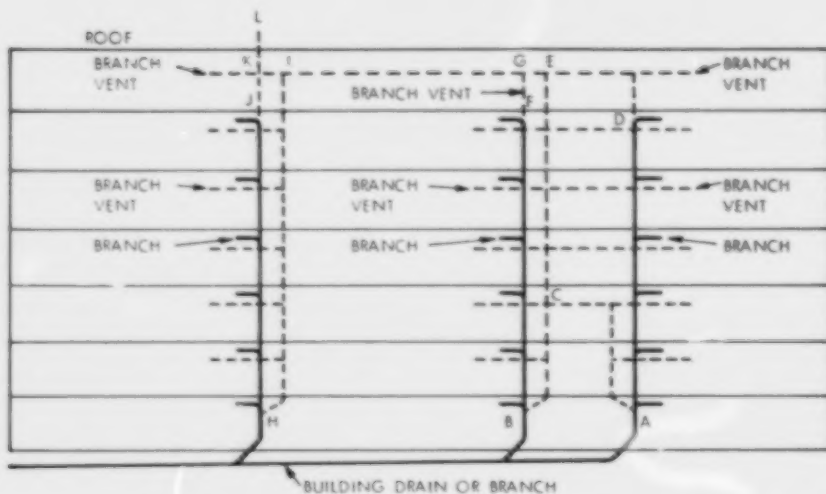
**Articles 5.8.2. and 5.8.3. LENGTHS TO BE CONSIDERED WHEN SIZING VENT PIPES**



(a)

| VENT               | LENGTH TO BE CONSIDERED                     | REFERENCE |
|--------------------|---------------------------------------------|-----------|
| Dual vent AC       | N/A                                         | 5.8.2.(1) |
| Continuous vent BC | BCEGH $1.8 + 1.2 + 0.6 + 2.1 + 1.8 = (7.5)$ | 5.8.2.(2) |
| Individual vent DE | N/A                                         | 5.8.2.(1) |
| Dual vent FG       | N/A                                         | 5.8.2.(1) |
| Branch vent CEGH   | ACEGH $2.4 + 2.7 + 0.6 + 2.1 + 1.8 = (9.6)$ | 5.8.2.(4) |

## Articles 5.8.2. and 5.8.3. (Cont'd.)



(b)

| VENT PIPE                                | LENGTH TO BE CONSIDERED | REFERENCE |
|------------------------------------------|-------------------------|-----------|
| Vent stack (AC)                          | ACEGJIL                 | 5.8.3.(2) |
| Vent stack (BC)                          | BCEGIKL                 | 5.8.3.(2) |
| Vent stack (HI)                          | MIKL                    | 5.8.3.(2) |
| Stack vent (DE)                          | DEGIKL                  | 5.8.3.(2) |
| Stack vent (FG)                          | FGIKL                   | 5.8.3.(2) |
| Stack vent (JK)                          | JIKL                    | 5.8.3.(2) |
| Header (CEGIKL)<br>for any section of it | ACEGIKL                 | 5.8.2.(5) |

## \* Sentence 6.1.1.(1) POTABLE WATER SYSTEMS

The design procedures contained in Chapter 35 of the "ASHRAE Guide and Data Book 1970," in Chapter 37 of the "ASHRAE Handbook, 1976 Systems," in ASPE 1975-76, Data Book, Volume I, "Basic Plumbing Design," in ASPE 1977-78, Data Book, Volume II, "Special Plumbing Systems Design" and in the British Columbia Institute of Technology Sizing Guide "Water Pipe Sizing, Engineered Method," are considered good engineering practice in the field of potable water systems.

### \* Article 6.1.13. WATER HAMMER PREVENTION

Water hammer is a build up of pressure in a length of horizontal or vertical pipe which occurs when a valve or faucet is closed suddenly. The longer the pipe and the greater the water velocity the greater is the pressure exerted on the pipe, which can be many times the normal static water pressure and be sufficient to burst the pipe. Ordinary kitchen and bathroom faucets can be closed quickly enough to cause water hammer even with relatively low water pressure in the pipe.

Means of preventing water hammer should be installed wherever there are valves or faucets, particularly where they are at the end of long lengths of pipe. This may be done by installing either water hammer arresters which are manufactured for the purpose or air chambers installed vertically that are fabricated from pieces of piping with a closed upper end and connected to the end of the horizontal or vertical run of pipe.

Air chambers should be accessible if they are the manufactured type with top air valve and a stop-and-waste valve or are of the diaphragm type. If made from piping, air chambers may become ineffective because of waterlogging, in which case provision should be made to drain that portion of the system. During the drainage operation fresh air is introduced into the chamber through the open faucet. After such draining, the valve or faucet should be closed before refilling the system with water, to ensure that the air chamber contains the maximum amount of air under pressure.

The published Standard PD1-WH201 is available, from the Plumbing and Drainage Institute, 5342 Boulevard Place, Indianapolis, Indiana, 46208. This Standard provides all the information necessary to size and place water hammer arrestors.

### Article 6.2.1.

Examples of equipment to which these requirements apply are residential or industrial space heating boilers to which chemicals may be added, or a sprinkler system to which anti-freeze may be added. To be effective, every device installed in a potable water system for protection against backflow must be maintained in good working condition. See explanation for definition for backflow preventer and for back-siphonage preventer (vacuum breaker).

### Guide for the Selection of Backflow Prevention Devices

\* Note: Where a choice of two or more devices is indicated the choice may be made by the "owner".

|                                                | No Device Required | "Check Valve With Atmospheric Puri" CVAP | "Atmospheric Vacuum Breaker" AVB | "Pressure Vacuum Breaker" PVB | "Double Check Valve" DCV | "Reduced Pressure Backflow Prev." RPB | "Air Gap" AG |
|------------------------------------------------|--------------------|------------------------------------------|----------------------------------|-------------------------------|--------------------------|---------------------------------------|--------------|
| A/C Units - water cooled                       | 0                  |                                          |                                  |                               |                          |                                       |              |
| Aspirators - laboratory                        |                    | 0                                        |                                  |                               | 0                        | 0                                     |              |
| Boiler Feed - no toxic additives               |                    | 0                                        |                                  |                               | 0                        | 0                                     | 0            |
| Boiler Feed - toxic additives                  |                    |                                          |                                  |                               |                          | 0                                     | 0            |
| Cupboards - open outlet                        |                    |                                          | 0                                |                               |                          |                                       |              |
| Cupboards - valved outlet                      |                    |                                          |                                  | 0                             |                          |                                       |              |
| Dishwashers - commercial                       |                    |                                          | 0                                | 0                             | 0                        | 0                                     | 0            |
| Flushing Rim Floor Drains                      |                    |                                          | 0                                | 0                             | 0                        | 0                                     |              |
| Flush Valves                                   |                    |                                          | 0                                |                               |                          |                                       |              |
| Hose Bibbs                                     |                    |                                          | 0                                |                               |                          |                                       |              |
| Irrigation System - valve upstream of device   |                    |                                          | 0                                | 0                             | 0                        | 0                                     | 0            |
| Irrigation System - valve downstream of device |                    |                                          |                                  | 0                             | 0                        | 0                                     | 0            |
| Irrigation System - (chemical additives)       |                    |                                          |                                  |                               |                          | 0                                     | 0            |
| Laboratory Faucets                             |                    | 0                                        | 0                                | 0                             | 0                        | 0                                     |              |
| Laundry Machines - commercial                  |                    |                                          | 0                                | 0                             | 0                        | 0                                     | 0            |
| Showers - handfield                            |                    |                                          | 0                                |                               |                          |                                       |              |
| Soft Drink Mixing Machine                      |                    | 0                                        |                                  |                               |                          |                                       |              |
| Sprinkler Systems - toxic additives            |                    |                                          |                                  |                               |                          | 0                                     | 0            |
| Standpipe Systems - toxic additives            |                    |                                          |                                  |                               |                          | 0                                     | 0            |
| Swimming pools - hose filled                   |                    |                                          | 0                                |                               |                          |                                       |              |
| Swimming pools - direct connection             |                    |                                          |                                  |                               | 0                        | 0                                     | 0            |
| Swimming pools - make-up tank                  |                    |                                          |                                  | 0                             | 0                        | 0                                     | 0            |
| Tanks* - open inlet                            |                    |                                          | 0                                | 0                             | 0                        | 0                                     | 0            |
| Tanks* - valved inlet                          |                    |                                          |                                  | 0                             | 0                        | 0                                     | 0            |
| Column 1                                       | 2                  | 3                                        | 4                                | 5                             | 6                        | 7                                     | 8            |

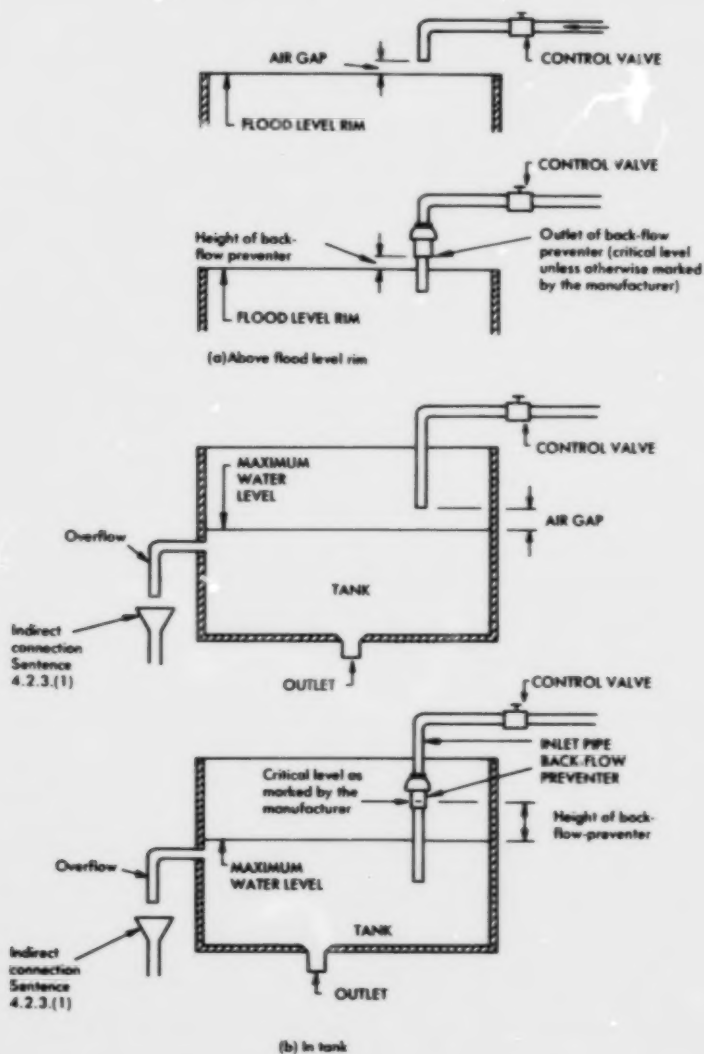
\* Containing other than potable water.

\* Sentence 6.2.1.(12)

The following table does not require the mandatory use of the devices listed. An assessment of the hazard must be carried out to determine the need, if any, for a device.

| PREMISE ISOLATION                                                        | Recommended<br>Device on<br>water<br>Service Pipe                               |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <u>Description of Premises</u>                                           |                                                                                 |
| Hospital buildings with operating,<br>mortuary or laboratory facilities. | RPBD                                                                            |
| Radioactive material processing plants.                                  | RPBD                                                                            |
| Petroleum processing facilities.                                         | RPBD                                                                            |
| Premises where inspection is restricted.                                 | RPBD                                                                            |
| Sewage treatment plants.                                                 | RPBD                                                                            |
| Commercial laundries (excluding laundromats).                            | RPBD                                                                            |
| Plating or chemical Plants.                                              | RPBD                                                                            |
| Docks, dockside facilities.                                              | RPBD (if no<br>protection<br>at fixtures)<br>DCV (If protection<br>at fixtures) |
| Food and beverage processing plants.                                     | RPBD                                                                            |
| Pleasure boat marinas.                                                   | DCV                                                                             |

# Sentences 6.2.3.(1) and 6.2.4(2) INSTALLATION OF AIR GAPS AND BACK-FLOW PREVENTERS



## Article 6.2.5.

The installation practices contained in the 1985 Fourth Edition of the "Accepted Procedure and Practice in Cross Connection Control Manual" published by the Pacific Northwest Section American Water Works committee are considered to be good engineering practice.

### Subsection 6.3.

This Subsection contains performance requirements for water systems. Two widely used references for the design of water systems are:

"Water-Distributing Systems for Buildings" by R. B. Hunter, Building Materials and Structures Report BMS 79, United States Department of Commerce, National Bureau of Standards, Washington, D.C., 1941, and

"National Plumbing Code Handbook" edited by V. T. Manas, McGraw-Hill Book Company, New York, U.S.A., 1957.

#### \* Sentence 6.3.4.(1) GUIDE FOR SIZING THE WATER SYSTEM

1. **Determining Conditions:** On any proposed water piping installation sized pursuant to Table 6.3.C., the following conditions shall be determined:
  - (a) Total number of fixture units as determined from Table 6.3.A. for the fixtures to be installed.
  - (b) Developed length of supply pipe from property line to most remote outlet, or if the pressure at the property line is unknown, use the developed length from the public water main to most remote outlet.
  - (c) Difference in elevation between the water piping at the property line or other source of supply and the highest fixture or outlet.
  - (d) Pressure in the public water main or other source of supply at the locality where the installation is to be made. Calculations shall be based on not to exceed 560 kPa pressure in the system.
  - (e) In localities where there is a wide fluctuation of pressure in the main throughout the day, the water piping systems shall be designed on the basis of the minimum pressure available.
2. **Size of Water Service Using Table 6.3.C.:** Knowing the available pressure at the property line, public water main or other source of supply, and after subtracting 10 kPa for each metre pressure for each metre of difference in elevation between such source of supply and the highest water outlet in the building or on the premises, use the "Pressure range" group within which this pressure will fall. Select the "length" column which is equal to or longer than the required length. Follow down the column to a fixture unit value equal to or greater than the total number of fixture units required by the installation. Having located the proper fixture unit value for the required length, the sizes of the water service and water distribution piping will be found in the two left-hand columns.
3. **Size of Branches:** The size of each branch shall be determined by the number of fixture units to be served by that branch, following the methods outlined in Sentence 2 above.
4. **Sizing for Direct Flush Valve Valves:** Branches and mains serving direct flush valve valves may be sized from Table 6.3.C. when the following values are assigned to each direct flush valve valve beginning with the most remote valve on each branch:

|                                         |                  |
|-----------------------------------------|------------------|
| For the first direct flush valve valve  | 40 fixture units |
| For the second direct flush valve valve | 30 fixture units |
| For the third direct flush valve valve  | 20 fixture units |
| For the fourth direct flush valve valve | 15 fixture units |
| For the fifth direct flush valve valve  | 10 fixture units |

After the fifth valve on any branch, subsequent loadings may be computed using the values given in Table 6.3.A. Piping supplying a direct flush valve valve shall not be less in size than the valve inlet.

5. **Hot Water Pipe Sizing:** In sizing the hot water piping of water distribution systems from Table 6.3.C., the greatest developed length of the cold water supply piping may be used and the length of the hot water piping ignored when the hot water piping friction loss is compensated for by the following method.
  - (a) Compute the total hot water fixture unit demand, using those values given in Table 6.3.A. for the combined hot and cold water use.

- (b) Assign the total demand computed as required in (a) above, as the fixture unit demand at the hot water supply branch and inlet.
- Cold Water Piping:** Starting at the most remote outlet on the cold water piping and working back toward the water service, compute the pipe sizing for the system from the length column originally selected in Table 6.3.C., using the fixture unit values given in Table 6.3.A., and adding in the fixture unit demand of the hot water heater supply inlet as computed in Sentence 5 above, at the point where it occurs. The final size of the cold water service need not be larger than the originally established size required by Table 6.3.C. for the total distribution system.
  - Hot Water Piping:** Starting at the most remote outlets on the hot water piping and working back toward the service water heater, compute the pipe sizing for the system from the length column originally selected in Table 6.3.C., using the fixture unit values given in Table 6.3.A.

#### Approximate Flow Velocity of Sewage for Given Slopes and Pipe Diameters

| Diameter of Pipe (Inches) | Flow Velocity (m/s) |          |         |         |
|---------------------------|---------------------|----------|---------|---------|
|                           | 1 in 200            | 1 in 100 | 1 in 50 | 1 in 25 |
| 1½                        | —                   | —        | .50     | .70     |
| 1½                        | —                   | .40      | .54     | .75     |
| 2                         | .30                 | .44      | .62     | .88     |
| 2½                        | .35                 | .50      | .70     | .99     |
| 3                         | .40                 | .54      | .75     | 1.08    |
| 4                         | .44                 | .62      | .88     | 1.25    |
| 5                         | .50                 | .70      | .99     | 1.39    |
| 6                         | .54                 | .75      | 1.08    | 1.50    |
| 8                         | .62                 | .88      | 1.25    | 1.75    |
| 10                        | .70                 | .99      | 1.39    | 1.96    |
| Column 1                  | 2                   | 3        | 4       | 5       |

# INDEX

## A

- Abbreviations of
  - organizations and authorities, 1.3.3.
  - words and phrases, 1.3.4.
- Acrylonitrile-butadiene-styrene (ABS pipe, 2.5.9., 2.5.10., 3.4.5.(2)(e), 3.4.5.(3))
- Administration, 1.8
- Air breaks, 1.3.2., 3.3.11., 4.2.3.
- Air gaps, 1.3.2., 6.2.3.
- Air tests, 3.6.1.(1), 3.6.5., 3.7.1.
- Aluminum Pipe, 2.7.9.(1), 2.7.9.(2), 2.7.9.(3), 3.2.1.(3), 3.2.3.(3), 3.2.4.(2), 3.2.4.(3), 3.3.2.(3), 3.3.10.(2), 3.4.3.(2), 3.4.5.(2)
- Application of Code, 1.1
- Asbestos-cement pipe and fittings, 2.5.1., 2.5.2., 3.4.5.(2)(d), 3.5.2.
- Atmospheric vacuum breaker, 2.9.9.(1), 6.2.1.(4), 6.2.4.(1)

## B

- Backfill for piping, 3.5.1.
- Backflow
  - definition, 1.3.2.
  - preventers, 1.3.2., 6.2.
  - protection from, 4.6.4.(2), 6.2.
- Back pressure
  - definition, 1.3.2.
  - preventers, 1.3.2., 2.9.9., 6.2.1.(7), 6.2.1.(8)
  - prevention, 6.2
- Back-siphonage
  - definition, 1.3.2.
  - preventers, 1.3.2., 2.9.9., 6.2.1.(5), 6.2.1.(8), 6.2.1.(9), 6.2.1.(10)
  - prevention, 6.2
- Backwater valves, 1.3.2., 4.6.4.
- Ball tests, 3.6.2.(2), 3.6.7.
- Branches
  - definition, 1.3.2.
  - hydraulic load on, 4.10.7.
  - serving water closets, 4.9.2.(2)
- Branch vents, 1.3.2., 5.6.4.(2), 5.7.2., 5.8.2.(1), 5.8.2.(4)
- Brass floor flanges, 2.9.1.
- Brass pipe, 2.7.1.(2), 3.4.5.(1)(g)
- Brass pipe flanges and fittings, 2.7.2., 2.7.3.
- Bronze pipe flanges and fittings, 2.7.2., 2.7.3.
- Building drains
  - cleanout for, 4.7.1.(5)
  - combined, 4.6.1.(2)
  - definition, 1.3.2.
  - hydraulic load on, 4.10.8., 4.10.9.
  - on drawings for plumbing permit, 1.8.1.(1)
  - protection of, from backflow, 4.6.4.(2), 4.6.4.(5)
  - protection of, from damage, 3.5
  - sanitary, 4.10.8.
  - size of, 4.9.2.(2), 4.10.D., 4.10.E.
  - storm, 4.10.9.

## Building sewers

- cleanouts for, 4.7.
- combined, 4.5.2.(1), 4.10.9.
- definition, 1.3.2.
- developed length of, 4.7.2.(3) and (4)
- hydraulic load on, 4.10.8., 4.10.9.
- size of, 4.10.D., 4.10.E.
- slope of, 4.10.D., 4.10.E.
- storm, 4.10.9.
- Building traps, 2.3, 4.5
  - cleanout for, 4.5.4.
  - definition, 1.3.2.
  - fresh air inlets for, 5.5.3.
  - location of, 4.5.4.
- Burned lead joints, 3.2.8., 3.3.5.

## C

- Cast-iron soil pipe and fittings, 2.6.1., 2.6.2., 3.3.2., 3.4.5.(2)(c)
- Cast-iron water pipe and fittings, 2.6.4., 2.6.5., 3.4.5.(2)(c)
- Caulked lead drainage joints, 3.2.1.
- Caulking compounds, cold, 2.8.2., 3.2.10.
- Caulking lead, 2.8.3.(1)
- Cement jointing mortar, 2.8.1.
- Cement joints, 3.2.7.
- Cement-mortar pipe lining, 2.6.4.(2)
- Check valves, 1.3.2., 4.2.1.(1)(a), 4.6.3.(6)
- Chlorinated poly (vinyl chloride) (CPVC) pipe and fittings, 2.5.7.
- Circuit vents, 1.3.2., 4.2.1.(1)(c), 5.3., 5.7.3., 5.8.2.
- Cleaning of water systems, 6.2.2.
- Cleanout
  - definition, 1.3.2.
  - fittings, 2.9.3.(2), 4.7.1.(2)
  - for traps, 4.5.4., 4.7.1.(2), 4.7.4.(3)
  - installation of, 4.7
  - location of, 4.7.1., 4.7.4.
  - manhole as, 4.7.3.
  - rodding of, 4.7.A., 4.7.4.(1)
  - size and spacing of, 4.7.2.
- Clear water waste, 1.3.2.
- Climatic data, 4.10.4.(1)
- Cold caulked joints, 3.2.10.
- Combined building drains
  - definition, 1.3.2.
  - restricted use of, 1.6.1.(2), 4.6.1.(2)
- Combined building sewers, 1.3.2., 4.5.2.(1), 4.10.9.
- Combined sewer, 1.3.2.
- Combined temperature and pressure relief valves, 2.9.10.
- Combustible
  - definition, 1.3.2.
  - piping, 2.5.10.(2)
- Compounds, caulking and sealing, 2.8.
- Concrete pipe and fittings, 2.5.3.
- Connections
  - direct, 4.2.1.(1), 4.2.3.

fixture, 4.2.1.  
 indirect, 4.2.1.(1)(a) and (d)  
 running thread and packing nut, 3.3.3.(1)  
 service, 1.6.  
 to drainage systems, 4.2., 4.3.4.  
 to lead bend, 4.2.1.(4)  
 to nominally horizontal offset, 4.2.1.(2)  
 to nominally horizontal soil-or-waste pipe,  
 4.2.1.(3)  
 to a vent stack, 4.2.1.(1)(g)  
 trap, 2.3.1.(2)

Continuous vents, 1.3.2., 5.8.2.(1) and (2)  
 Cooling of hot waste, 4.4.2.  
 Copper pipe, 2.7.1.(1), 3.4.5.(2)(g)  
 Copper tube, 2.7.4., 3.3.10, 3.4.5.(2)(g)  
 Corrugated steel pipe and coupling, 2.6.8.  
 Couplings, mechanical pipe, 2.9.4.  
 CPVC (see Chlorinated poly [vinyl chloride]  
 pipe)  
 Cross fittings, 2.4.1.(2)

## D

Dead ends in piping, 4.6.1.(3)  
 Definitions, 1.3  
 Developed length  
 definition, 1.3.2.  
 of fixture outlet pipes, 4.8.2.  
 of trap arm for vent pipes, 5.6.3.(1)  
 Direct flush valves, 2.9.7.  
 Dissimilar materials, joints for, 3.3.6.  
 Documents, referenced, 1.10  
 Downspouts (see Leaders)  
 Drains (see Building drains, Fixture drains,  
 Roof drains)  
 Drawings, 1.8  
 Drainage equipment, 4.6.3.  
 Drainage joint, caulked lead, 3.2.1.  
 Drainage of piping, 6.1.2.  
 Drainage piping, 2.6.1.  
 arrangement of, 4.6  
 hydraulic loads on, 4.10  
 location of, 4.6.2.  
 minimum slope and length of, 4.8.  
 sizing of, 4.9.  
 Drainage systems, 4  
 arrangement of piping, 4.6  
 cleanouts, 4.7  
 connections to, 4.2, 4.3.4.  
 definition, 1.3.2.  
 hydraulic loads, 4.10  
 location of fixtures, 4.3  
 minimum slope and length of pipes, 4.8  
 sanitary, 4.4.1., 4.7.1.(1)  
 size of pipes, 4.9  
 storm, 4.2.1.(1), 4.5.2., 4.7.1.(1), 4.10.9.  
 testing of, 3.6  
 traps, 4.5  
 treatment of sewage and wastes, 4.4  
 Drawings and related documents, 1.8  
 Drilled and tapped joints, 3.3.1.

Drinking fountains, 4.2.1.(1)(a)  
 Drinking fountain bubblers, 2.9.8.  
 Dual vents, 1.3.2., 5.8.2.(1)

## E

Eavestroughs (see Gutters, roof)  
 Ejectors, 4.6.3.(7)  
 Electrical insulation at piping supports, 3.4.3.  
 Enamelled fixtures, 2.2.2.  
 Equivalents, 1.4  
 Expansion and contraction, piping system,  
 3.3.9.

## F

Ferrous pipe and fittings, 2.6  
 Fittings, 2.4-2.7  
 brass or bronze, 2.7.2., 2.7.3.  
 butt-fusion, 2.5.5.(4)  
 cast-iron, 2.6.5.  
 concrete, 2.5.3.(4)  
 CPVC hot and cold water pipe, 2.5.7.  
 cross, 2.4.1.(2)  
 ferrous, 2.6  
 flared joint, 2.7.7.  
 installation of pipe, 3., 1.(4)  
 insert, 2.5.5.(3)  
 lead, 2.7.8.(1)  
 malleable iron, 2.6.6.  
 marking of, 2.1.5.  
 non-ferrous, 2.7  
 non-metallitic, 2.5  
 on drawings for plumbing permit, 1.8.1.(1)  
 plastic, 2.5.9., 2.5.10.  
 polybutylene, 2.5.8.  
 restrictions on use of, 2.4, 2.5.3.(4),  
 2.5.4.(3)  
 screwed, 2.6.5., 2.6.6.  
 single or double sanitary T, 2.4.2.  
 sisson, 2.4.4.  
 solder-joint, 2.7.5., 2.7.6.  
 supply and waste, 2.9.6.  
 T, 2.4.1.(1)  
 vitrified clay, 2.5.4.  
 Fixtures, 2.2  
 connections of, 4.2.1., 4.2.2., 4.2.3.,  
 5.5.4., 5.6.4.  
 construction of, 2.2  
 definition, 1.3.2.  
 enamelled, 2.2.2.(3) and (4)  
 future installation of, 5.5.4.  
 hydraulic load from, 4.9.A., 4.10  
 indirectly connected, 3.3.11., 4.2.1.(1)(d),  
 4.5.1.(4)  
 installation of, 1.7.1., 3.4.1., 4.3.1., 6.1.7.  
 location of, 1.7.1., 1.7.2., 4.3  
 plastic, 2.2.2.(6)  
 specifications for, 2.2  
 stainless steel, 2.2.2.(5)  
 used, 2.1.4.  
 vitreous, 2.2.2.(2)

**Fixture drains**

- cleanouts for, 4.7.1.(9)
- connections of, to wet vents, 5.2.1.
- definition, 1.3.2.
- fixture traps for, 5.6.3.(1) and (2)
- for floor outlet fixtures, 3.3.8.(1)
- minimum slope of, 4.8.1.
- protection of, from backflow, 4.6.4.(2)
- size of, 4.10.D., 4.10.E.
- venting of traps for, 5.1.1.

**Fixture outlet pipes**

- definition, 1.3.2.
- developed length of, 4.8.2.
- for indirectly connected fixtures, 4.2.3.(2)
- size of, 4.9.3.

**Fixture units**

- conversion to litres, 4.10.5.
- definition, 1.3.2.

**Flanges**

- floor, 2.9.1., 3.3.8.
- water closet, 2.9.2.(1)

**Flared joints, 3.2.5.****Flared joint fittings, 2.7.7.****Floor drains**

- connections of, to drainage systems, 4.2.1.(1)(h), 4.3.4., 4.5.2.(2)

- traps for, 4.5.2.(2), 5.1.1.(2)

**Floor outlet fixtures, drain connections, 3.3.8.****Flow control roof drain, 1.3.2., 4.10.4.(2)****Flushing devices, 2.9.7., 6.1.11.****Freezing, protection from, 3.5.4.****Fresh air inlets, 1.3.2., 5.5.3.****G****Galvanized steel pipe, 2.6.7.****Garbage grinders, 4.3.3.****Grease interceptors (see Interceptors)****Groove and shoulder mechanical pipe couplings, 2.9.4.****Gutters, roof, 4.10.10.****H****Hangers, pipe, 3.4.3., 3.4.5.(4) and (5)****Headers, 1.3.2., 5.8.2.(1), 5.8.2.(5)****Horizontal offsets (see Offsets in piping)****Horizontal piping, support of, 3.4.5.****Hot poured joints, 3.2.6.****Hub and spigot, pipe, 3.2.1.(4)****Hydrant, frostproof, 6.1.9.****Hydraulic loads, determination of, 4.10****I****Increaser fittings, 3.3.4.****Indirect connections, 3.3.11., 4.2.1.(1)(d), 4.3.2.****Individual vents, 1.3.2., 5.8.2.(1)****Inlets, fresh air, 5.5.3.****Installation of fixtures, 1.7.1., 3.4.1., 4.3.1., 6.1.7.****Insulation, electrical at piping supports, 3.4.3.****Interceptors**

- capacity of, 4.4.3.(4)
- cleanouts for, 4.7.1.(9)
- definition, 1.3.2.
- design of, 2.3.2.
- drum trap for, 2.3.1.(4)
- gasoline, 4.4.3.(2)
- grease, 4.4.3.(1)
- oil, 4.4.3.(2)
- replacing traps, 4.5.1.(5)
- restricted use of, 4.3.3.
- venting of, 5.5.2.
- where required, 4.4.3.(1) to (3)

**Island Fixture, 4.2.1.(1)(i)****J****Jointing materials, 2.8****Joints, pipe, 3.2 and 3.3****L****Lead**

- caulking, 2.8.3.(1)
- waste pipe and fittings, 2.7.8., 3.4.5.(2)(b)

**Leaders (downspouts)**

- connections of, to roof drain, 3.3.7.

**definition, 1.3.2.****hydraulic load on, 4.10.11.****sheet metal, 2.6.9.****trap for, 4.5.2.(1) and (2)****Lighting of rooms, 1.7.1.(1)****Loads, hydraulic, 4.10****M****Malleable iron water fittings, screwed, 2.6.6.****Manholes, as cleanouts, 4.7.2.(2), 4.7.3.****Marking of pipes and fittings, 2.1.5., 7.2.1.****Materials and equipment****defects in, 2.1.2.****equivalents, 1.4.1.****exposure of, 2.1.3.(1), 2.1.3.(2)****for fittings, 2.4-2.7****for fixtures, 2.2****for traps and interceptors, 2.3****jointing, 2.8****marking of, 2.1.5., 7.2.1.****miscellaneous, 2.9****used, 2.1.4.(1), 2.1.4.(2)****Mechanical joints, 3.2.9.****pipe couplings for, 2.9.4.****Mortar, cement jointing, 2.8.1.****N****Nominally horizontal****definition, 1.3.2.****piping, 3.4.5.****Nominally vertical, 1.3.2.****Noncombustible piping****definition, 1.3.2.****piping, 2.5.10.(3)**

Non-ferrous pipe and fittings, 2.7  
 Non-metallic pipe and fittings, 2.5  
 Non-potable water systems, 7  
   connections of, to potable water systems,  
     6.2, 7.1.1.  
   identification of, 7.2.1.  
   location of pipes and outlets for,  
     7.3.1., 7.3.2.

## O

Offsets in piping, 1.3.2., 4.2.1.(2)  
 Oil interceptors (see Interceptors)  
 Outlets from non-potable water system, 7.3.2.  
 Overflows  
   rainwater tank, 4.2.2.  
   sink, 2.2.4.

## P

Paved surfaces, hydraulic load from, 4.10.4.  
 Permits, plumbing, 1.8.1.  
 Pipe  
   acrylonitrile-butadiene-styrene (ABS), 2.5.9.,  
     2.5.10., 3.4.5.(2)(e), 3.4.5.(3)  
   applications, summary of, 2.5., 2.7.  
   asbestos-cement, 2.5.1., 2.5.2.,  
     3.4.5.(2)(d), 3.5.2.  
   brass, 2.7.1.(2), 2.7.2., 3.4.5.(2)(g)  
   cast-iron soil, 2.6.1., 2.6.2., 3.3.2.,  
     3.4.5.(2)(c)  
   cast-iron water, 2.6.4., 3.4.5.(2)(c)  
   chlorinated poly (vinyl chloride) (CPVC),  
     2.5.7., 3.4.5.(3)  
   combustible, 2.5.10.(2)  
   concrete, 2.5.3.  
   copper, 2.7.1.(1), 3.4.5.(2)(g)  
   ductile-iron water, 2.6.4.(4)  
   flanges and fittings, brass or bronze,  
     2.7.2., 2.7.3.  
   hangers, 3.4.3., 3.4.5.(4)  
   hub and spigot, 3.2.1.(4)  
   joints and connections, 3.2 and 3.3  
   lead waste, 2.7.8., 3.4.5.(2)(b)  
   marking of, 2.1.5., 7.2.1.  
   noncombustible, 2.5.10.(3)  
   open end, 4.6.1.(3)  
   plastic, 2.5.9., 2.5.10., 3.4.5.(2)(e),  
     3.4.5.(3), 6.1.10.  
   polybutylene, 2.5.8., 3.4.5.(2)(f)  
   polyethylene water, 2.5.5.  
   poly (vinyl chloride) (PVC), 2.5.6.,  
     3.4.5.(2)(e), 3.4.5.(3)  
   protection of, 3.5  
   sheet metal, 2.6.9.  
   size of, 4.9  
   steel, 2.6.7., 2.6.8., 3.3.2.(2), 3.4.5.(2)(a)  
   subsoil drainage, 4.5.3., 4.6.4.(5)  
   vitrified clay, 2.5.4., 3.5.2.  
   underground, 3.4.6., 3.5.1.  
   water supply, 6 and 7  
   welded and seamless steel, 2.6.7.

## Piping

  construction and use of joints, 3.2  
   drainage of, 6.1.2.  
   installation of, 3.3.9, 3.5.3.  
   joints and connections, 3.3  
   maximum pressure on, 2.1.7.(1), 2.1.8.  
   nominally horizontal, 3.4.5., 3.4.6.  
   protection of, 3.5  
   support of, 3.4  
   system, design temperature and pressure of,  
     2.5.7.(2)  
   testing of, in drainage and venting systems,  
     3.6  
   testing of, in potable water systems, 3.7  
 Plastic pipe and fittings, 2.5.9., 2.5.10.  
 Plumbing facilities, 1.5.1.  
 Polybutylene pipe and fittings, 2.5.8.  
 Polyethylene water pipe, 2.5.5.  
 Poly (vinyl chloride) (PVC) pipe and fittings,  
   2.5.6., 3.4.5.(2)(e), 3.4.5.(3)  
 Potable water systems, 6  
   arrangement of piping for, 6.1  
   connections of, to potable and non-potable  
     water systems, 6.2.1., 7.1.1.  
   design of, 3.4.2., 6.3.1.  
   layout on drawings for plumbing permit,  
     1.8.1.(1)  
   protection of, from contamination, 6.2  
   size and capacity of pipes, 6.3  
   tanks for, 3.4.2.  
   testing of, 3.7  
 Potato peelers, 4.3.3.  
 Pressure reducing valves, 6.3.3.  
 Pressure relief valves, 2.9.10., 6.1.12.(1)  
 Private sewage disposal systems, 1.3.2., 4.4.1.  
 Private water supply system, 1.3.2., 6.2.1.  
 Protection of piping, 3.5

## Q

Quarter bend fittings, 2.4.3.

## R

Rainfall, 4.10.4.(1)  
 Reducer fittings, 3.3.4.  
 Referenced documents, 1.10.  
 Relief valves  
   discharge pipe for, 6.1.12.(6)  
   specifications for, 2.9.10.  
   where required, 6.1.12.  
 Relief vents  
   connections to, 5.4.4.  
   definition, 1.3.2.  
   minimum size of, 5.7.3.  
 Risers  
   definition, 1.3.2.  
   shut-off valves for, 6.1.4.  
 Roof drains  
   connection to a leader, 3.3.7.  
   definition, 1.3.2.  
   flow control, 4.10.4.(2)

Roof gutters, 1.3.2., 4.10.10.  
 Roofs, hydraulic load from, 4.10.4.(1)  
 Rubber gasket joints, 2.6.4.(4)

## S

Saddle hubs or fittings, 2.9.5.  
 Sanitary building drains or sewers (see Building drains or Building sewers)  
 definition, 1.3.2.  
 Sanitary drainage systems, 1.3.2., 4.4.1., 4.7.1.(1)  
 Sanitary T fittings, 2.4.2.  
 Scope of Code, 1.2.1.  
 Screwed cast-iron water fittings, 2.6.5.  
 Screwed joints, 3.2.3.  
 Screwed malleable iron water fittings, 2.6.6.  
 Service water heaters, 1.3.2., 6.1.12.(2)  
 Sewage treatment and disposal systems, 4.4  
 Sewers (see Building Sewers)  
 Sheet lead, welds in, 3.2.8.(3)  
 Sheet metal leaders, 2.6.9.  
 Shower receptors, 2.2.3.(1)  
 Shut-off valves, 4.6.3.(6), 6.1.3.-6.1.8.  
 Sinks, dishwashing and food preparation, 2.2.4.  
 Sisson fittings, 2.4.4.  
 Size of  
   cleanouts, 4.7.2.(1)  
   drainage pipes, 4.9  
   fixture outlet pipes, 4.9.3.  
   vent pipes, 5.7.2.-5.7.7., 5.8  
   water service pipes, 6.3.4.(2)  
   water supply pipes, 6.3  
 Slip joints, 3.3.3.(2)  
 Slope of drainage pipes, 4.8  
 Soil-or-waste pipes  
   definition, 1.3.2.  
   location of, 4.6.2.  
   on drawing for plumbing permit, 1.8.1.(1)  
   size of, 4.9.1.  
 Soil-or-waste stacks  
   cleanouts for, 4.7.1.(7)  
   definition, 1.3.2.  
   hydraulic load on, 4.10.6.  
   size of, 4.9.2.(3)  
   vent pipes for, 5.4  
 Soil pipe, cast-iron, 2.6.1., 3.3.2, 3.4.5.(2)(c)  
 Solder, wiping, 2.8.3.(1)  
 Soldered joint, 3.2.4.  
 Solder-joint fittings, 2.7.5. and 2.7.6.  
 S-trap standards, installation of, 3.3.8.  
 Stacks, hydraulic load on, 4.10.6.  
 Stack venting, 5.4.1.(2)  
 Stack vents  
   definition, 1.3.2.  
   requirement for, 5.4.1.(1)  
   size of, 5.7.2., 5.8.3.  
 Steel pipe (welded and seamless), 2.6.7.  
 Stop-and-waste cocks, 6.1.9.

Storage type service water heaters,  
 1.3.2., 6.1.12.  
 Storm building drains or sewers (see Building drains or Building sewers)  
 definition, 1.3.2.  
 Storm drainage systems  
   connection of, 4.2.1.(1)(a)  
   definition, 1.3.2.  
   hydraulic load on, 4.10.9.  
   sizing of, 4.10  
   sumps for, 4.6.3.  
   traps for, 4.5.2.  
 Stubs, lead water closet, 3.3.8.(5)  
 Subsoil drainage pipes  
   connection of, 4.6.4.(5)  
   definition, 1.3.2.  
 Sumps, 4.6.3.  
   venting of, 5.7.6.  
 Supply and waste fittings, 2.9.6.  
 Supports for piping, 3.4

## T

T fittings, 2.4.1.(1)  
 Temperature limit controls, 6.1.12.(2)  
 Temperature relief valves  
   specifications for, 2.9.10.  
   where required, 6.1.12.(2)  
 Terminals, vent pipe, 5.6.5.  
 Testing of  
   drainage and venting systems, 3.6  
   potable water system, 3.7  
 Threaded cast-iron drainage fittings, 2.6.3.  
 Trap arms, 1.3.2., 5.2.1.(1)(e), 5.6.3.  
 Trap seals  
   maintaining, 4.5.5.  
   size of, 2.3.1.(1)  
 Trap standards  
   definition, 1.3.2.  
   installation of, 3.3.8.  
 Traps  
   bell, 2.3.1.(3)  
   cleanouts for, 2.3.1.(2), 4.5.4.  
   connections for, 2.3.1.(2)  
   definition, 1.3.2.  
   design of, 2.3.1.  
   drum, 2.3.1.(4)  
   for fixtures, 4.5.1., 4.9.A.  
   for leaders, 4.5.2.(1) and (2)  
   for storm drainage systems, 4.5.2.  
   for subsoil drains, 4.5.3.  
   interceptors used as, 4.5.1.(5)  
   location of, 4.5.4.  
   on drawings for plumbing permit, 1.8.1.(1)  
   restricted locations, 4.3.2.  
   venting of, 5.1, 5.6.3.  
 Treatment of sewage and wastes, 4.4  
 Tube, copper, 2.7.4., 3.3.10.(1)

## U

- Underground pipes
  - protection of, 3.5.1. and 3.5.2.
  - support of, 3.4.6.
- Unions and slip joints, 3.3.3., 4.6.3.(6)
- Urinals
  - installation of, 3.3.8., 4.3.1.
- Used materials, 2.1.4.(1), 2.1.4.(2)

## V

- Vacuum breakers (see Back-siphonage preventers)
  - definition, 1.3.2.
- Valves
  - backwater, 4.6.4.
  - check, 4.2.1.(1)(a), 4.6.3.(6)
  - direct flush, 2.9.7.
  - gate, 4.6.4.
  - pressure reducing, 6.3.3.
  - pressure relief, 2.9.10., 6.1.12.(1) and (3)
  - shut-off, 4.6.3.(6)
  - tank-type water closet, 6.2.3.(2)
  - temperature relief, 2.9.10., 6.1.12.(2) and (4)
  - vacuum relief, 2.9.10, 6.1.12.(1)
- Ventilation of rooms, 1.7.1.(1)
- Venting
  - of floor drains, 5.1.1.(2)
  - of oil interceptors, 5.5.2.
  - of sewage sumps, 5.5.1.
  - stack, 5.4.1.(2)
  - systems, testing of, 3.6
  - wet, 5.2, 5.6.4.(1), 5.8.1.(1)
- Vents
  - branch, 5.6.4.(2), 5.7.2., 5.8.2.(1) and (4)
  - circuit, 5.3, 5.7.3., 5.8.2.(1) and (3)
  - continuous, 5.8.2.(1)
  - dual, 5.8.2.(1)
  - for manholes, 5.7.5.
  - for traps, 5.1
  - individual, 5.8.2.(1)
  - relief, 5.4.4.
  - stack, 5.4.1., 5.8.3.
  - yoke, 5.4.3., 5.7.4.
- Vent pipes
  - definition, 1.3.2.
  - arrangement of, 5.6
  - fixture connections to, 4.2.1.
  - for soil or waste stacks, 5.4
  - for traps, 5.1
  - location of, 5.6.3.
  - minimum size of, 5.7
  - miscellaneous, 5.5
  - not required, 5.1.1.(2) and (3)
  - on drawings for plumbing permit, 1.8.1.(1)
  - sizing of, 5.8
  - support of, above roof, 3.4.7.
  - terminals of, 5.6.5.(1)-(3)
- Vent stacks
  - definition, 1.3.2.

- sizing of, 5.7.2., 5.8.3.(1)-(2)
- where required, 5.4.2.

- Vertical piping, support of, 3.4.4.(1)-(2)
- Vitreous china fixtures, 2.2.2.(2)
- Vitrified clay pipe and fittings, 2.5.4., 3.5.2.

## W

- Waste pipe, lead, 2.7.8., 3.4.5.(2)(b)
- Waste, cooling of, 4.4.2.
- Water closets, installation of, 2.9.2., 3.3.8.
- Water closet bowls, installation of, 3.4.1.(2) and (3)
- Water closet seats, 1.7.1.(2)
- Water hammer, prevention of, 6.1.13.
- Water heaters
  - storage type, 6.1.12.
- Water pipe
  - asbestos-cement, 2.5.2.
  - size and capacity of, 6.3
- Water service pipe
  - sizing of, 6.3.4.
- Water treatment device, 6.2.1.(2)
- Water supply, for fixtures, 6.3.1.
- Water systems (see Potable water systems, non-potable water systems)
- Water tests, 3.6.2.(1), 3.6.4., 3.7.1., 3.7.2., 3.7.3.
- Welded and seamless steel pipe, 2.6.7.
- Welded joints, 3.3.2.
- Welded sheet lead, 3.2.8.(3)
- Wet venting, 5.2 and 5.8.1.
  - definition, 1.3.2.
- Wiped joint, 3.2.2.
- Wiping solder, 2.8.3.

## Y

- Yoke vent
  - definition, 1.3.2.
  - minimum size of, 5.7.4.
  - where required, 5.4.3.

### CONVERSION FACTORS

| TO CONVERT              | TO                   | MULTIPLY BY    |
|-------------------------|----------------------|----------------|
| m                       | ft                   | 3.281          |
| m <sup>2</sup>          | ft <sup>2</sup>      | 10.76          |
| m <sup>3</sup>          | ft <sup>3</sup>      | 35.31          |
| mm                      | in                   | 0.03937        |
| L                       | gal(imp.)            | 0.2200         |
| °C                      | °F                   | 1.8 and add 32 |
| kg                      | lb                   | 2.205          |
| N                       | lbf                  | 0.2248         |
| kPa                     | lbf/in <sup>2</sup>  | 0.1450         |
| kPa                     | lbf/ft <sup>2</sup>  | 20.88          |
| L/s                     | gal/min              | 13.20          |
| m <sup>3</sup> /h       | ft <sup>3</sup> /min | 0.5886         |
| m/s                     | ft/min               | 196.8          |
| MJ                      | Btu                  | 947.8          |
| W                       | Btu/hr               | 3.412          |
| lx                      | ft-candle            | 0.09290        |
| ng/Pa - sm <sup>2</sup> | perms                | 0.6853         |